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Doric Portico at Athens
Water Colour Drawing by James Stuart (1713-88)

R.I.B.A. Collection

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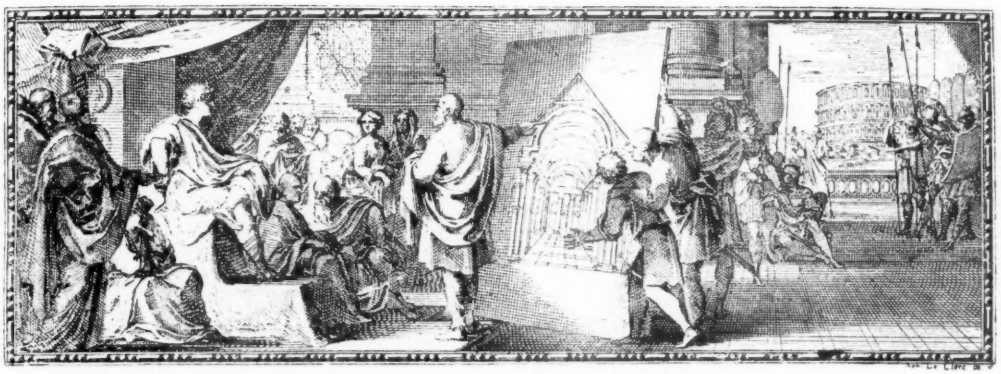


Cracks and Decay in Buildings due to Expansion and Contraction

BY OSCAR FABER, O.B.E., D.SC., M.INST.C.E. [*Hon. A.*].

[*Read before the Royal Institute of British Architects on Monday, 7 January* 1929.]

WHEN I was still younger than I am to-day, I used to wonder at the number of cracks I saw in buildings and structures of all kinds. After many years of study, I now wonder at the fact that buildings and other structures do not show many more cracks than they do.

The object of this paper is to indicate as shortly as reasonable accuracy will allow, the causes of movements in building materials, in the hope that this will assist my colleagues to a better understanding of when to expect cracks and how to avoid them. Brevity with clarity demands that I classify materials into three main groups :—

I. Non-porous and impervious.
II. Porous but seasoned.
III. Porous but unseasoned.

I. Impervious Materials.—This group is by far the simplest. It is represented by the metals, such as steel, but other materials such as marble and granite approach closely to imperviousness.

Impervious materials change their length in two ways :—

(*a*) By change of temperature.
(*b*) By change of stress.

(*a*) Thus steel expands approximately .000006 inches per inch per degree Fahr. rise in temperature (the expansion being practically proportioned to the temperature change). This may seem so little as to be of no interest to " practical men."* But if a bridge or viaduct floor expands from 30° F. to 80° F., the expansion at this rate on a length of 100 feet—

$$.000006 \times 50^\circ \times 1200'' = .36 \text{ inches.}$$

Dry and seasoned concrete expands with temperature rise very much as steel, and with practically the same coefficient. A reinforced concrete viaduct at Sittingbourne is 2,400 feet long, which would represent an expansion of $8\frac{1}{2}$ inches. This would clearly be very destructive if unprovided for. Actually the viaduct was divided into 100 foot sections with expansion joints between. The gaps were found to be about $\frac{3}{8}$ inch less at 3 p.m. after exposure to a hot sun, as compared with 3 a.m. on a cold clear night. This is in close agreement with the previous figure. The force of this expansion is enormous. At one stage in construction a granite pebble got wedged into the joint in the morning and resisted the expansion, with the consequence that after mid-day a large piece of deck was blown off with a loud report.

(*b*) Steel (for example) may be lengthened by pulling it or shortened by compressing it. Within

* So far as I can gather, a practical man is one who has no accurate knowledge of anything.

the elastic limit the change of length is proportional to the change of stress, the latter divided by the former on a specimen of unit length being therefore a constant for the material, and known as Young's Modulus of Elasticity. For steel it has the value of

$$E = 30 \text{ million lb. per sq. inch.}$$

Again, it may seem that the lengthening or shortening by stress inside the elastic limit is so little as to be of no interest to the " practical man." But a steel deck 100 feet long compressed to 9,000 lb. per square inch will shorten by

$$\frac{1{,}200 \text{ inches} \times 9{,}000}{30{,}000{,}000} = .36 \text{ inches}$$

In flat arches, such shortenings produce considerable fall of the crown and resultant bending stresses unless the arch is three hinged.

But the aspect of the problem to which I wish to draw attention is the interplay between change of length by temperature and stress. There are many places where expansion due to temperature is resisted more or less completely. Suppose, for example, a 100 feet of viaduct floor of steel expands through 50° F. as in (*a*). This tends to lengthen it by .36 inches if the ends are free. But suppose they are fixed in relatively immovable buttresses. Then the latter push it back to its original length, so that the shortening due to compression balances the lengthening due to temperature. Hence the stress developed will be that required to shorten it .36 inches which was shown in (*b*) to be 9,000 lb. per square inch. In this sense, each degree Fahr. of temperature change produces a stress of

$$\frac{9{,}000}{50} = 180 \text{ lb. per square inch.}$$

With dry seasoned concrete having a Young's Modulus of 4,000,000 lb. per square inch the corresponding figure is 24 lb. per square inch. Hence a change of 50° (if resisted) would produce a stress of 1,200 lb. per square inch or double the L.C.C. permissible in compression. If the change is towards lower temperatures it will produce tensile stresses greater than the ultimate and cracks will result. From this aspect, the compressibility under stress enables materials to withstand change of temperature when confined or restrained. The lower Young's Modulus, the smaller will the resultant stresses be. In the case of concrete, however, the strength and the Young's Modulus rise and fall together* so that a given temperature rise will produce the same proportion of ultimate strength whatever the strength of the concrete.

One form of restraint is common, namely, that imposed by the inside of the block on its exposed surface. A wall may have its outer surface exposed to frost at one time and hot sun another, while the inside remains practically at the same temperature. This may easily produce stresses sufficient to produce cracks. After the war, some students burnt a gun carriage at the base of the Nelson Memorial in Trafalgar Square. The granite surface was heated, tried to expand, but was restrained by its backing, and the resultant stresses were sufficient to spall it off. As they say in guide books, the marks are there to this day to prove it.

II. Porous but Seasoned Materials.—These are represented by timber, concretes, bricks, etc., which have been seasoned long enough to acquire constant volume consistent with the conditions under which they are seasoned. In the case of timber and concrete, a year or two are required, more is better, less is better than nothing. This bracketing together of timber and concrete may seem strange, but the more we learn about concrete, the closer becomes this similarity of properties, as will be seen more clearly later. These materials, when seasoned, expand and contract with temperature and stress—(*a*) and (*b*) as in Section I.

(*c*) But a third condition, producing change of length, is introduced, namely, ***change of humidity***. Timber, however long seasoned, will absorb moisture and expand if immersed. What is perhaps more remarkable, it will do so if exposed to an atmosphere of greater humidity than that at which it has been kept. Thus a timber seasoned in an atmosphere of 30 per cent. humidity, absorbs moisture from the air if exposed to air at 60 per cent. humidity, and expands in doing so. This is remarkable, when it is realised that 60 per cent. humidity air has no free moisture, the water existing only as water vapour—the air is well below the dew point when the water is deposited on non-porous surfaces. Hence the importance of seasoning woods to the humidity conditions they are likely to be exposed to afterwards, and of keeping down the humidity of buildings by warming them while wood block floors are being laid. Hence, also, the housewife's anxiety to " air " linen sheets (another porous material) before use, however dry they may have been after ironing.

Concretes, and bricks, have these properties also in proportion as they are porous. Thus, a well

* $E = 1000 \times$ strength of cubes.
$= 1430 \times$ strength of cylinders having a length twice the diameter.

seasoned ordinary 4 : 2 : 1 ballast concrete (*i.e.*, made with impervious sand and aggregate) expands about .00025 of its length on immersion. This represents .3 inches in 100 feet, that is to say, of the same order as that produced by a change of temperature of 50° F. (see (*a*)) or a stress of about 1,200 lb. per square inch (see (*b*)). Consequently, what was said previously about stresses and cracks produced by expansion or contraction by change of temperature applies equally to expansion and contraction due to moisture changes.

But the ballast concrete to which reference has been made represents a relatively impervious concrete. If we make concretes of porous materials, they expand and contract much more with wetting. Thus, as compared with .00025 for 4 : 2 : 1 gravel concrete, a sample of Aerocrete gave about .0015 (six times as much), and much the same result was found for breeze concrete, Novocrete (" mineralised " sawdust and cement). There is no doubt that these porous concretes are very liable to produce cracks owing to their great shrinkage when a building dries out, even when they are made of well seasoned pre-cast slabs, and this accords well with our experience of partitions made with breeze concrete and similar materials. As in many problems, the porosity which from this aspect is a disadvantage, is associated with corresponding advantages, namely, good " suction " enabling the plaster to adhere well, and lightness.

But good adhesion can be obtained in other ways. In the Bank of England rebuilding, we lay on the centering rubber sheets with raised square ribs with same size valleys between them (see Fig. 1).

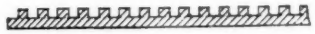


FIG. 1.
DETAIL OF RUBBER SHEETING.
TO GIVE KEYED SOFFIT.

The floors are cast on this of impervious concrete. After the centering is struck, these sheets are pulled off for re-use, leaving a perfect key for render or plaster.

As compared with the coefficient for concrete (.00025) natural stones range from .00004 for Hopton Wood (one-sixth) to York Stone .0005 (double) along a horizontal bed. Portland is about .00008 (about one-third).

There is little doubt that the relatively low humidity expansion of limestones such as Portland accounts for their comparatively good resistance to a climate with such frequent changes from wet to dry as ours, which is more damaging to sand stones and their greater humidity expansion. The interplay of humidity, stress, and temperature movements are somewhat similar to those of the two we studied for impervious materials. If a wall surface is initially cold and dry and subsequently hot and wet, and restrained from expanding, it would be stressed roughly twice as much as if subjected to expansion by either rise of temperature or increase of moisture contents alone. This would be a very damaging condition. But it probably never occurs over the full range, and generally change of temperature and humidity more or less cancel one another. Thus a shower on a hot wall generally cools it and the sun on a wet one dries it as it warms. Indeed, owing to the absorption of moisture from air even much below 100 per cent. humidity some skill is needed in testing to separate the two effects.

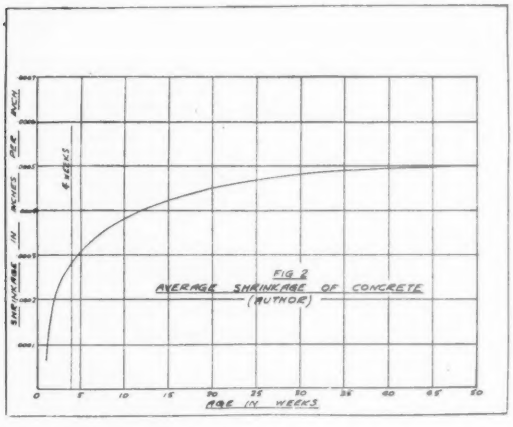
A piece of concrete warmed expands through rise of temperature, but at the same time loses moisture, and suffers contraction in consequence. Similarly on cooling, it contracts from reduction of temperature, but absorbs water vapour by coming in contact with air of lower percentage humidity.

III. Porous Unseasoned Materials.—Examples are newly-sawn timber, and recently cast concrete. All such materials are subject to changes of length previously discussed, due to changes in (*a*) temperature ; (*b*) stress ; (*c*) humidity ; which are all directly proportional and reversible, *i.e.*, they can be repeated in either direction. But they are also subject to two others : (*d*) shrinkage on seasoning ; (*e*) plastic yield. These both depend on the duration and age and are irreversible.

(*d*) *Shrinkage on Seasoning.*—Timber, in seasoning, shrinks so much as to be noticeable to the practical man, a quarter of an inch in a foot across the grain being common. Door panels of partially seasoned timber often show half this shrinkage. Timber shrinks in seasoning much more than it will subsequently expand, even when immersed,

showing that the change is irreversible. Similarly, concrete on hardening shrinks enough to produce "shrinkage cracks" when restrained. This is not to be confused with shrinkage on drying, the former being irreversible, and the latter, as we have already seen, reversible.

A typical diagram of shrinkage of ordinary 4 : 2 : 1 ballast concrete with time is shown in Fig. 2.*



It will be seen that the total shrinkage is about .0005 in a year, but in the first three weeks about half this has already occurred.

We noticed before that the expansion of similar concrete on immersion (a similar contraction on drying from fully wet) was only .00025, or one-half, showing clearly that the shrinkage from hardening (or seasoning) is irreversible. The two are indeed quite separate, and may be superimposed or may more or less balance one another. Naturally, the exact value of the shrinkage in seasoning is not independent of wetness, cement contents, and other variables in the concrete, but there is no time to digress on these.

(*e*) *Plastic Yield.*—If a perfectly elastic material is loaded, it deforms, but when the load is removed, it returns to its original shape. Well-seasoned timber and steel (stressed inside the elastic limit) approximate to elastic materials. Thus a steel girder, when reasonably loaded, deflects, and the deflection remains steady however long the load remains on it. When the load is removed, the beam returns to its original shape. Well-seasoned timber does the same.

Unseasoned timber behaves quite differently. A beam of it, when loaded, deflects when the load is first applied, but goes on increasing its deflection as time elapses, relatively fast at first, more slowly later as the timber becomes more seasoned. The deflection may be divided into two parts, the deflection which occurs when the load is first applied, and the remainder which depends on the time element. The former is called the elastic deflection, the second the "plastic yield." If the load is removed after a long application, the elastic deflection disappears and the "plastic yield" remains as a permanent set. This is well understood by builders and timber merchants who, when setting planks of valuable woods to season, carefully level them up, plank by plank, knowing that any bending will become permanent.

Exactly the same thing happens with recently-cast (or unseasoned) concrete. As this is comparatively recently established on a scientific basis, the author may perhaps be excused for referring briefly to some research of his on this subject, fuller details of which may be found in the paper before the Institution of Civil Engineers, to which reference has been made. He had four similar beams of reinforced concrete made up and loaded so that beam 2 was loaded more than 1, and so on with Nos. 3 and 4, the calculated stresses being :

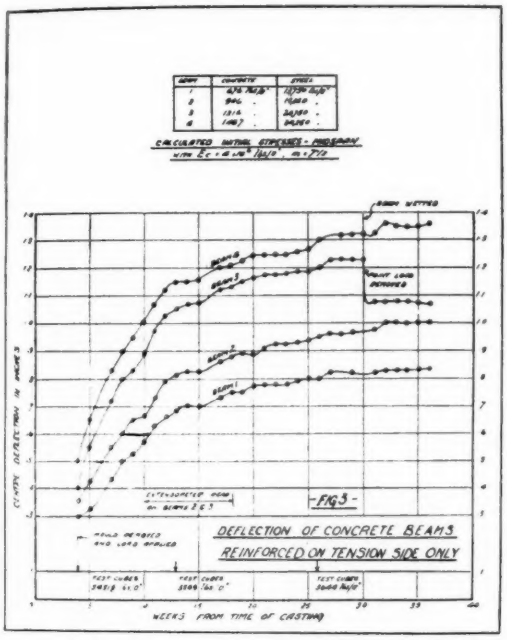
Beam.	*Concrete.*	*Steel.*
1	676 lb. per sq. in.	13,750 lb. per sq. in.
2	946 ,,	19,250 ,,
3	1,216 ,,	24,750 ,,
4	1,487 ,,	30,250 ,,

At the age of four weeks they were "struck" and loaded, the deflection then being :

Beam.	*Initial Deflection.*
1	·3 ins.
2	·35 ,,
3	·4 ,,
4	·5 ,,

The load was left quite steady, and the beams were watched for a year. Had the beams been elastic (as steel), no increase in deflection would occur. Actually the deflection increased as shown on Fig. 3.

* Taken from a paper by the author Min. Proc. Inst. Civil Engineers, November 15, 1927, entitled "Plastic Yield, Shrinkage, and Other Properties of Concrete." A copy has been presented to the R.I.B.A. Library.



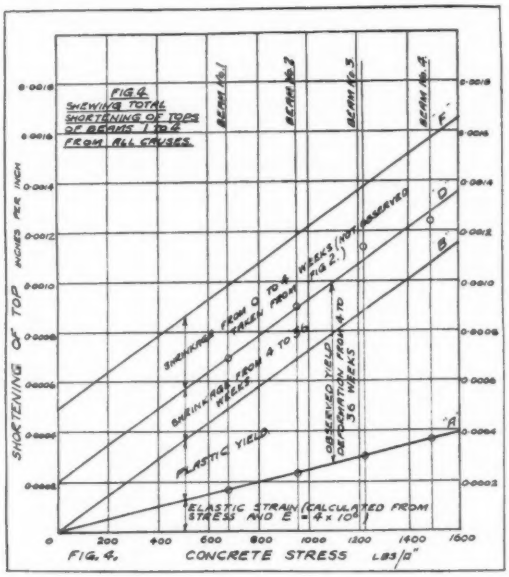
The deflection at the age of thirty weeks (from casting) being :

Beam.	*Deflection at thirty weeks.*
1	.82 ins.
2	.97 ,,
3	1.23 ,,
4	1.325 ,,

that is, nearly three times the initial, so that in this period the " plastic yield " was about twice the elastic deflection, but had the load been applied earlier, it would have been even greater.

This result has nothing to do with shrinkage, because the top and bottom would shrink together, and no warping would result. This was verified by keeping beam 4 quite wet after the thirtieth week. The curve shows this had practically no effect. Beam No. 3 had part of its load removed at thirty weeks and replaced a few weeks later. The curve shows that the proportionate elastic deflection disappeared and reappeared, leaving the whole " plastic yield " as a permanent set. Very accurate and delicate optical extensometers were fixed to the top and bottom while this deflection was occurring, which enabled the change in length of the top and bottom to be measured.

Without troubling you with tiresome details and calculations (which can be found in the original paper) it may be stated that careful analysis of these results enabled the shrinkage, elastic strain, and plastic yield of the top to be separated for each beam. These are plotted in Fig. 4.



Against the initial concrete stress, which shows (*a*) the shrinkage is independent of the stress ; (*b*) the elastic strain or shortening is proportional to the stress ; (*c*) the plastic yield is also proportional to the stress, and (for this period) about twice the elastic ; (*d*) the total shortening in thirty-six weeks is about six times the elastic strain for concrete stressed to 600 lb. per sq. inch. This ratio diminishes with higher stresses, and increases with lesser ones.

The close analogy of unseasoned concrete with unseasoned timber is, I think, noteworthy.

Now, in reinforced concrete, a compression member generally has steel rods embedded in it, and the stress in these may be calculated from Young's Modulus when the shortening is known. (See Part I. (*b*)) But the only shortening normally taken into account in the L.C.C. and other current regulations and text books is the " elastic " shortening, and we have seen that shrinkage and plastic yield may increase this (and consequently the steel stress) some six times.

In the paper already referred to the author has shown that a certain concrete column with 1 per cent. of steel and concrete having E=4,000,000 lb. per sq. inch, would have the following stresses as ordinarily calculated.

Concrete.	*Steel.*
564 lb. per sq. inch.	4,230 lb. per sq. inch.

whereas, if loaded at four weeks, the stresses at the age of a year, taking shrinkage and plastic yield into account, would amount to

Concrete.	*Steel.*
389 lb. per sq. inch.	21,500 lb. per sq. inch.

This difference, particularly the great increase in the steel stress is important.

The author has been represented as intending this to be proof that reinforced concrete is not a safe material. He would therefore desire to say quite clearly that this is an inference he had not drawn from the researches. There is no room here for a highly technical digression on this, but the excellent service of well designed and well-built reinforced structures is sufficient evidence. The researches do, however, show that the distribution of stresses is very different in reinforced compression members from that commonly supposed and show the necessity for close binding and good cover. At the author's suggestion, the Building Research Department put in hand a comprehensive research on this subject and it has confirmed the author's results in a remarkable manner. The paper already referred to contains a method of calculating stresses taking all these matters into account.

General Discussion.—Having now skimmed lightly over the subject, a few general considerations may be of interest.

1. A structure composed of seasoned precast blocks is less likely to crack than one of *in situ* concrete, because while both are subject to contraction with drying and cooling, the *in situ* has the shrinkage in seasoning additionally. (I refer, of course, to precast blocks of the same quality as the *in situ* and not to some of the very porous blocks made by certain block making machines with semi dry concrete.) There is another reason for this superiority. When concrete sets, the chemical action produces heat and rise of temperature. In the Bank of England underpinning there is a retaining wall 8 feet thick of ordinary concrete. A thermometer buried in the heart of this indicated a rise of 50° F. in three days (*i.e.* from 50° to 100° F.).

With some much richer concrete for strong room construction, the temperature rise was approximately 100° F. (*i.e.*, from 50° to 150° F.). Rapid hardening cements release their heat more quickly, and produce higher temperatures, as there is less time for its gradual dissipation by radiation. The shrinkage would therefore include that due to cooling down from these considerable temperatures. If deposited in thick masses where the heat is not readily dissipated, very serious cracks would result in *in situ* work, but in blocks construction, all this expansion and subsequent contraction can occur without restraint, and the seasoned article sets when these movements are completed.

This does not apply, of course, to structures which are free to expand without restraint, such as the viaduct at Sittingbourne already referred to, where the deck was free between expansion joints, and was free from shrinkage cracks. But ordinary buildings are greatly restrained by the weight they exert on the ground, and often by their neighbours.

2. Seasoned blocks of stone or concrete having a small expansion on immersion are, other things equal, likely to stand much longer before decaying than those having a large expansion. In this respect, limestones are generally better than sandstones. There is no time for the consideration of the chemical aspect of decay.

3. Many structures of precast blocks (particularly brickwork in lime mortar) form their own expansion joints, whether visible or not, in the mortar joints. This enables the surface to expand or contract with relatively little restraint. This surface protects the inner body of wall from great changes of humidity or temperature.

4. It is doubtful whether, in view of these considerations, the monolithic conception is quite as attractive as before these were understood. A small specimen may be cast as a monolith, because its restraint is small, and it is free to shrink without cracking. But a large structure is heavy and requires great forces to move its ends.

5. The raked out joints, thought perhaps to be a survival of an old custom of doubtful justification, or an architectural fad, acquire a new significance.

6. Chimneys, and other structures having to resist considerable temperature changes as well as stresses due to wind and weight, are more liable to crack. In brickwork, the cracks may be so small

and frequent (every joint) as not to be noticeable, while in concrete they are likely to occur less frequently (generally at each construction joint, say 3 feet apart) and consequently larger and more noticeable. Concrete chimneys are best arranged with a lining to the top, to provide differentiation of function, the lining resisting heat and no wind pressure, the outer shell *vice-versa*. A chimney built to the author's design in 1908 is still free from cracks, and many have been built since.

7. Reinforced floors and beams, in view of "plastic yield," should have the centering left up as long as possible, and the longer they can be kept unloaded the better. The fact that the concrete does not fail when the centering is struck is not everything and permanent deflection is minimised by allowing the concrete to season as long as possible before it is stressed. Some movement in concrete structures may proceed under load for quite long periods. These are not necessarily dangerous, and may only show that the concrete is seasoning normally.

The test loading of a grand stand of cantilever construction gave the following deflections :—

Test load* applied.	Next day.	Next day.	Load partly Removed.	Next day load all Removed.
.407 ins.	.434	.446	.2	.12

The author could quote numerous examples from his own practice, and from America, of gradual deflection over a period of years, without cracking, in quite safe buildings.

8. Nothing in this paper is intended as a criticism of reinforced concrete. This material can be designed to meet all the conditions required. But it is often designed without much regard to them (especially in commercial competitive designing) and then cracks result and (sometimes) decay sets in.

9. *In situ* concreting is best done in lengths with definite rebated joints between sections. If alternate sections are cast first, nearly half the shrinkage can be taken up before the last sections are cast. Better still is to cast the structure in sections with only quite narrow joints left between them, which are cast last, as late as possible. In this way most of the shrinkage due to setting can be eliminated. In some strong room work at the Bank of England rebuilding, with very rich concrete, where the problem is accentuated, this was successful where ordinary methods had produced objectionable cracks.

10. Interesting problems arise in connection with floors heated by hot water in embedded pipes.* When the author first applied this, he had some anxiety on the score of its effect on the structure. But further consideration showed this to be unfounded. Water in these pipes does not usually exceed 130° F. and probably the pipe does not exceed 120° F. The actual concrete floor is not heated to over 100° F. The expansion of the concrete is therefore of the order of 50° F., and amounts to .36 inches in 100 feet. (See 1A.) This only balances the seasoning shrinkage of the concrete floor, (also .36 inches in 100 feet). (See 1B.) Part I of the Bank of England has had its embedded heating working several months without any sign of crack, and several buildings, including the County Fire Office in Piccadilly Circus, for several years, without any structural damage or cracking. I must resist the temptation to digress into the merits or otherwise of this system of heating and the technics of its proper application.

11. Expansion joints, however, may introduce difficulties of their own if they are not designed with great care. Fig. 5 illustrates the viaduct at Sittingbourne to which reference has already been made.

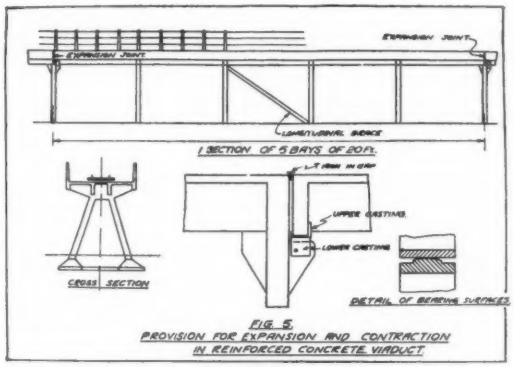


FIG. 5.
PROVISION FOR EXPANSION AND CONTRACTION IN REINFORCED CONCRETE VIADUCT

It is interesting in this connection as being an example of a long structure in which the stresses due to expansion and contraction are almost completely eliminated.

The figure shows a section of five bays between expansion joints. It is clear that the viaduct needs bracing longitudinally, otherwise a train suddenly applying its brakes would tend to take the section

* This load took two days to apply, so that the figure of .407 contains some plastic yield.

* Sometimes misnamed "Panel Heating."

that it was resting on, with it. At the same time, if bracing were put in all bays the effect would be to fix the ends of each section relatively to the ground and prevent the deck from expanding into the gap freely. In fact the expansion of the deck would be resisted by tensions in the diagonal braces. This has been avoided by bracing longitudinally only the centre bay, the brace of which is made strong enough to take the whole longitudinal forces exerted by the braking of a train on the whole 100 feet section. This leaves the end perfectly free to expand without restraint. The expansion joints in this case contained bearing pads as shown on the figure which were made of machined cast iron arranged to a very slight curve so as to take up the slope of the beam when it deflects and at the same time to be free to move longitudinally.

Fig. 6A showing a division wall between two large expanses of factory floor on which beams are given a bearing with an expansion joint between them, shows an expansion joint badly done. The load from the beams owing to their slight deflection will be near the edges of the bearings as given by the arrows " a." When the slabs expand probably no harm results, but whenever they contract and the beams move apart, as shown by the arrows " b," they drag away the outer portions of the wall which gradually spalls away as shown by the cracks " c." This could be prevented by capping the wall with a steel bearing plate as shown on Fig. 6B.

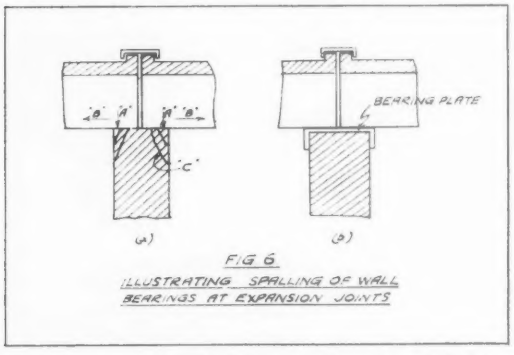


FIG 6.
ILLUSTRATING SPALLING OF WALL BEARINGS AT EXPANSION JOINTS

In the new Grand Stand at Lord's, which is a rather interesting cantilever construction, the deck is also split up into 100 feet lengths, the joint in this case consisting of a definite gap between two cantilever ends so that no bearing or friction between the ends is necessary. In this case there are people under as well as over so that a shallow gutter is necessary under the joint to catch any water coming through. This construction is illustrated in Fig. 7.

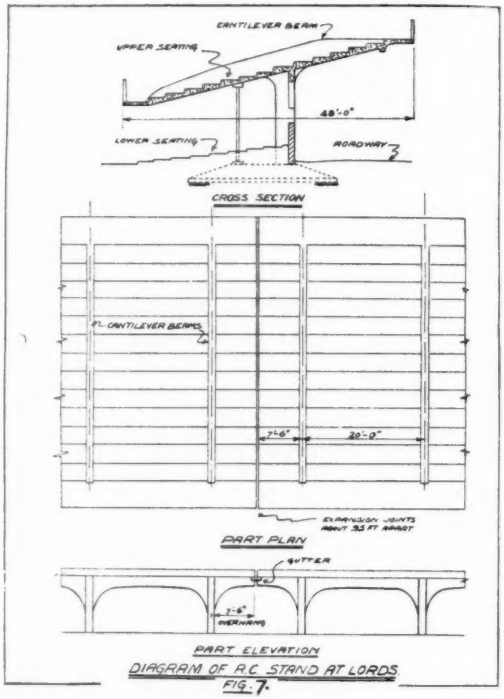


DIAGRAM OF R.C. STAND AT LORDS
FIG. 7.

12. The problem of large flat roofs is an interesting one. Many manufacturers of waterproofing liquids for concrete are so confident that they can make concrete watertight that they have frequently proposed to eliminate asphalte or its equivalent if their compound is used in connection with the concrete.

There is, of course, no difficulty whatever in making concrete watertight, but a large flat roof will inevitably crack owing to the combined action of seasoning shrinkage and the other expansions and contractions to which it is subject, and unless very special provision is made to leave complete freedom by dividing it up into sections with complete freedom it invariably cracks and none of these ordinary waterproofing compounds are therefore any good for this purpose. What is required is a material which will either prevent concrete cracking under these conditions or alternatively a material like asphalte which will stretch across the cracks without itself cracking.

Discussion

THE PRESIDENT, MR. WALTER TAPPER, A.R.A., IN THE CHAIR

Mr. ALAN E. MUNBY [F.], in proposing the vote of thanks to Dr. Faber, said: One of the most important points in to-night's subject is the question of seasoning, and I think we shall all feel a little alarmed at the length of time it is necessary for these structures to be up before they can be looked upon as fit for the purposes for which they have been designed. The idea of plastic yield is something almost new to me. I recognised there was a certain amount of movement until the concrete set, but I did not think the plastic yield extended as far as Dr. Faber tells us it does. It gives one rather a shock to imagine what will happen to a concrete structure if, in the hurry of modern requirements, one has to load it up to its proper complement before it is sufficiently rigid for the purpose. It would be in many cases difficult to form large masses of non situ concrete and transport them to their proper positions in a building, and if we are to have our buildings made in sections and transported to the sites, I expect we shall want Dr. Faber to make our joints for us when we put these sections together.

With regard to heating, I would like to ask whether Dr. Faber contends that the heating pipes in the "panel" system are retained in contact with the concrete. Though the expansion and contraction of the pipes is of the same order as that of concrete, one can hardly believe those pipes are permanently in contact because the temperature changes in the concrete itself must be very small compared with the changes in temperature which occur in the pipes. But if it is so, I would ask him what is the best time (for there must be a certain best time) for putting a heating installation into operation for the first time, relative to the age of the concrete, if the contact is to be established and maintained. I think there must be some specific period, having regard to the contraction of the concrete itself.

I think we are all particularly interested in the rubber centering. I have seen its application in other ways, but I should not have thought of it in this connection. I would warn any young architect against using ordinary plaster three-coat work or patent plasters on a concrete soffit, even though well washed over. There have been various cases, and expensive ones, of ceilings falling down from such uses. The plaster, really to adhere, must be gauged unless use is made of Dr. Faber's ingenious method of keying.

I should like to ask whether Dr. Faber will tell us a little about some other materials which give trouble in the matter of cracking. We have many troubles, difficulties with surface materials—plasters, tiles, various bodies which adhere indifferently to one another. I take it is a matter of conductivity, for one thing, of co-efficient of expansion, and possibly, in some cases, of humidity. It does not seem to be enough to have two materials which have the same co-efficient of expansion, and there is a number of problems which want solving from this aspect.

Mr. W. E. VERNON CROMPTON [F.], in seconding the vote of thanks said:

We have been introduced, this evening, to the scientific aspect of materials. I am convinced that in the increasingly exacting nature of our architectural practice it is essential for us to keep in touch as much as we can with the development of scientific research in relation to these materials. We have the way made easier because there exists, at Watford, the Building Research Board, which, under the direction of Dr. Stradling, lays itself out to give all possible assistance to architects. It is engaged in some very fundamental work, and now Dr. Faber comes and, because of his own scientific researches, places before us in understandable language the sort of thing we architects need to know, if we are to serve the public well. I agree that the architect, regarded as a layman, considers that fundamental scientific research is a very dilatory and uninteresting thing ("No, no"). I am not talking of the manner that Dr. Faber puts the matter before us, because we must appreciate that Dr. Faber has not dealt with fundamentals this evening, but because of this exact scientific knowledge, he has been able to give us a bird's-eye view and lay before us in a comparatively simple way the result of his research. I think we, like the ordinary man in the street, are impatient of fundamental research, and think that the scientific man is inclined to fiddle in carrying out his research while the walls of Rome are cracking.

Now to deal with certain points in the paper. When I read it through, during the week-end, the one matter which struck me particularly was Dr. Faber's recognition of the similarity of properties of such apparently unlike materials as timber and concrete. I think that is a comparatively new idea, but it enables us to grasp certain difficulties which we find in our practice, because timber and concrete have the common characteristic that there is a loss of strength and a change of stress and strain value when they absorb water. Just as a door shrinks when it is seasoned and has got rid of its moisture, so, at higher temperatures, concrete shrinks. We have heard about the expansion of the viaduct at Sittingbourne at ordinary temperatures. But as concrete contracts at higher temperatures and the embedded steel expands, does this not mean

the destruction of adhesion between the steel and the concrete ?

A further point has to do with the first figure we saw on the screen. We were shown the deflection curves of four beams unequally loaded. I noted in all the curves at the 15th day that the curves became horizontal, and after that point they jumped away again, as if there was some peculiarity at the 15th day (Dr. Faber : Do you mean the 15th week ?). Yes, the 15th week. I do not know whether Dr. Faber has any point to raise about this peculiarity.

Referring to a later remark about " raked-out " joints, he says " The raked-out joints, thought perhaps to be a survival of an old custom of doubtful justification, or an architectural fad, acquire a new significance." I am afraid the inner meaning of that sentence escapes me.

With regard to the very clear contribution which has been given with reference to plastic yield and elastic deflection, does not plastic yield in reinforced concrete, as distinct from elastic deflection, have a detrimental effect on the adhesion of concrete and steel ? I presume that in ordinary elastic deflection the adhesion between the concrete and the steel is not interfered with ; but it seems to me that plastic yield must affect the integrity of the adhesion.

My final question has to do with the numerous examples which we all know, of the gradual deflection of concrete buildings over a period of years and yet there was no cracking. I suggest to him that this may be due to the flow of the particles of the material permitted by the colloidal structure of the set Portland cement in the concrete. I would like to hear Dr. Faber's views on that.

Sir HERBERT BAKER [*F.*] : Dr. Faber's essay gives us a most interesting confirmation of the saying of the old Greek philosopher, " παντα ρει," " everything is in a state of flux " ; and after the lapse of twenty-four centuries it would have been interesting if that old philosopher could have been present to-night to hear Dr. Faber's paper and learn that what we think our great invention of steel-fibred concrete has no less than five independent movements of its own. It is a very unhappy position to one who, like myself, thought we were in a new monolithic age of architecture. We hope Dr. Faber will enable us to make our structures, if not monolithic, at least as megalithic as possible. There is, we are told, a shrinkage of one-third of an inch in 100 feet ; that is four inches in a quarter of a mile at a temperature of 50°. And if in a hot climate you double that, making it 100° variation, that will be about 9 inches. So I expect to dream to-night that I shall find a 9 inch crack in my Secretariat at Delhi. And I expect Mr. Lanchester may dream the same thing about his buildings in India, as Jodhpore is, I think, even hotter than Delhi. It is a consolation, however, to know that this 9 inches may be distributed over the whole building. It is a most important matter in hot climates, where the range of temperature is very great. A good deal of building has been done in Central Africa, in high lands where there is frost at night and a tropical sun during the day. There, I think, they have experienced great difficulties, even in the case of cast-concrete blocks. Mr. Dangerfield, the Government architect of Kenya, is just back from there, and perhaps he will say a few words on the subject.

I am immensely glad to be here to-night to give my testimony and thanks, which you will, I am sure, agree with, to structural and mechanical engineers in general, and Dr. Faber in particular, for the help they and he are giving us in collaboration. It is most important for the engineer to see things from the architectural point of view, and for the architect to understand the engineer's point of view and adapt his design to it. Dr. Faber is pre-eminently able and sympathetic to understand what the architect is driving at.

This conflict between the artistic and the scientific side must always be a very real one amongst architects. The older one gets, the longer art seems, and if one does one's purely artistic work, together with all its ramifications of sculpture, painting and craftsmanship, it would be almost superhuman to have enough energy left for the scientific side ; and so collaboration with an engineer becomes really essential. This ought, I think, to be recognised in public. There has been a good deal of talk about the architect signing his buildings ; but the engineer should sign too.

This is surely not a new question ; there has always been this duality, this conflict in the individual between art and science. One might venture to consider the greatest names in the arts, particularly Leonardo da Vinci, who was both a great scientist and artist. What did he produce ? You can count his pictures on your hands, and he has not, I think, left any sculpture at all. And even Michael Angelo must have been worried with the more practical side of his work and would have been the better for the help of an engineer. If he had, he might not have been so quarrelsome and irritable as he was. So perhaps both those great artists might have produced more if they had had a Dr. Faber to collaborate with them ! In the case of our own Christopher Wren perhaps the conflict was the other way ; he was at first a great scientist and mechanical engineer, and one can imagine a conflict in his nature to combine these with his artistic expression. He must have often longed to get back to his science and his philosophy. We feel this from his pathetic sigh, when finally he left St. Paul's, " nunc me jubet fortuna expeditius philosophari."

Mr. SYLVESTER SULLIVAN [*F.*] : Most of us, I

suppose, have come across, at some time, the extraordinary fractures set up in buildings where the expansion of concrete has not been provided for, or through the use of unsuitable breeze in the aggregate of the concrete. And I expect some of us have seen the effect that hot sun has had on railway metals when the expansion joints have been insufficient. Sir Herbert Baker has mentioned the designing of buildings in hot climates, and he wonders what effect the expansion from heat will have on some of his buildings in Delhi. It seems to me the same considerations might apply to buildings in Canada, where in winter the internal temperature of buildings is kept up to some 70° over, while the outside temperature is anything to 50° below zero. It would appear that some sort of distortion must be set up; I do not know whether Dr. Faber has experience of buildings designed to meet conditions of that sort. I think there must be some difficult problems raised in these cases.

I would ask Dr. Faber one question. Though I am pretty certain there is an answer to it, I would like him to tell us what it is. He has mentioned what is to me a new fact, the rise in temperature in the setting of concrete; for instance, in his 8 feet thick walls of the Bank of England where there was an increase of temperature during setting of 50 . Could not that be avoided? Is there not some means of preventing that happening?

One case of cracking which was known to me was rather curious; I do not suggest it is of scientific value. I came across, in the hot summer of 1921, a case in which a damp-course of bitumen and sand had been used, and the hot sun had caused this to spread or squeeze, and the building had slid to the south, leaving the northern side of the building less affected, because it was cooler. Therefore I would like to warn our younger members not to use a mixture of bitumen and sand, even in our equable climate, for the purpose of making a damp course.

Mr. J. S. WILSON A.C.G.I., M.Inst.C.E.: The various matters referred to by Dr. Faber have been put in an extraordinarily clear manner. All the subject matter is not, of course, new, but much of what is new is the result of work carried out by Dr. Faber or initiated by him and is of great importance. It is well known that the older engineers were very reluctant to take up the use of reinforced concrete and try to overcome the difficulties they foresaw, and the advocates and enthusiasts in the use of that material adopted a rather militant attitude. It was said that reinforced concrete was the only thing to use and suggested that there was some sort of magic about it. Twenty-five years ago an eminent civil engineer, the late Sir Alexander Binnie, in order to study the behaviour of concrete, built an experimental piece 100 feet long and watched it carefully. He found that it expanded and contracted with temperature and that atmospheric conditions altered its length as much as $\frac{5}{16}$ inch. Other engineers without having definite quantitative proof as to expansion and shrinkage, now made available by the experiments referred to in this paper, had their suspicions as to the wisdom of the juxtaposition of steel and concrete.

It is interesting to conjecture whether the advocates of reinforced concrete construction would have made the progress they have if the present definite quantitative information as to the expansion and shrinkage of concrete had been available in the early days. Now, we have a large number of reinforced concrete buildings and structures which have substantiated many of the claims made by advocates of that material. Nevertheless, the principles of design assume that when you cast your concrete round your steel you start fair, and that there is no stress on either. These later experiments prove that you cannot start fair; the concrete expands and contracts in various ways and, as pointed out by Dr. Faber, the methods of calculation must be subject to considerable modification if you want to get at the real conditions of stress in the material and it is a point worth remembering with regard to reinforced concrete structures. It is a most important material for structural purposes, but although I do not suggest architects are more easily impressed than engineers, it does look as if some allow themselves to be swayed by the enthusiasm of the reinforced concrete advocates and the extraordinary claims made for the combination of steel and concrete. It has been stated, for instance, that with concrete in contact with steel the concrete is stronger in itself, and some even say that the steel also gets stronger.

An instance illustrating that the early architects were aware of the expansions and movements of stone and masonry and how they got over the difficulty is of interest. At the top of a spire the stones are subject to great temperature and moisture variations, and get loose through the expansions and contractions referred to in Dr. Faber's paper, so that the metal road carrying the weather-cock, even if cemented into the stones, could not remain fast. In some old churches, instead of the rod being fixed in that way, it is made long, passes right through the top stones, and to the lower end a weight is attached; the rod is shaped so that the whole weight bears on the top stone, with the result that all the upper stones are held down definitely and constantly by the suspended weight whatever expansion or contraction might take place in them.

Another instance of the effect of expansion and contraction is the frequent loosening of coping-stones. These are subject to considerable variations of temperature and moisture, and in a long length, the end stones will be found loose or pushed partly off. The explanation is that the effect of heat or moisture ex-

panding the stones is cumulative, for on contracting after expansion, the open spaces formed in the vertical joints get filled with dust or displaced mortar and the next expansion produces additional movement, and in the course of years very appreciable movement will result. By leaving occasional vertical joints open and wide enough to prevent small particles from lodging in them, the difficulty can be avoided.

Movement due to expansion and contraction from whatever cause can be rendered far less noticeable or harmful by the use of lime mortar. With cement mortar the slightest movement results in cracks which pass through joints and bricks or stones indiscriminately, but lime mortar is more accommodating and it is only necessary to remember the extent to which some old buildings of brickwork in lime mortar have gone out of shape without cracking to realise this.

Mr. H. V. LANCHESTER [*F.*]: I have learned a great deal this evening, and the paper has thrown some light on various experiences of my own. I remember, before I became a practising architect, going down on to some work in which they had put a 60-foot cement floor, and the wall had gone out about 6 inches. That is the sort of experience one is fortunate to get before going into practice; I have not seen anything of the kind since.

I felt very interested in what Sir Herbert Baker said about India and the high temperatures there. I do not know whether it is known to Dr. Faber, but it may be of interest to mention that in India there is much syenitic rock, not stratified, but laminated like slate. When the sun acts on one of these rocks it splits, and I have seen slabs so split off half the size of this room, showing that nothing will withstand the rending force of heat. And in India the masons, if the sun does not split the rock, light fires on it to accelerate the separation and from the slab they cut strips of rock, to be used for telegraph posts and other purposes.

I, as an architect, am rather a traditionalist, and I am careful about trying experiments in India. It is better to build on the lines that the old people built on, and so I have not gone in heavily for monolithic structures there. In some parts they use bricks, and they are prepared to use big stones, having wide joints. They rely on putting the stones together in a structural way, rather than using strong cementing material between them. Therefore if I have the good fortune to construct big stone buildings there, I hope I shall not have to cope with these defects of monolithic construction which are liable to occur at high temperatures.

Mr. PAUL DANGERFIELD [*A.*]: I have recently returned from Kenya, where we have done a good deal of work in concrete blocks and other concrete—stone is not very suitable—and we have had a good deal of trouble from cracking. One of the causes of trouble has been the great changes from wetness to dryness. When the rains are not on, the air is very dry indeed, and when it is the rainy season the air is correspondingly wet. Perhaps Dr. Faber can tell us the effect of that on concrete. In concrete block buildings we get cracking which appears to be similar to the cracking in monolithic buildings. I thought the explanation might be that, though blocks were used, they are built up with mortar and that may make the structure behave like a monolithic building, because the mortar makes it one aggregate.

Mr. P. J. WALDRAM [*L.*]: The subject of plastic yield is most interesting, more particularly because shortly before the War there was a series of practical lectures on reinforced concrete at the Westminster Technical Institute, attended largely by architects and District Surveyors who made a successful attempt to ascertain the theory, then unknown, of the deflection of reinforced concrete. It was interesting to note that in every one of the beams we made, when they were loaded and unloaded, there was a marked hysteresis gap between the load-deflection curves of loading and unloading, indicating plastic yield or permanent set. Nothing more was done owing to the War.

When we realise that deformations represent strains and that strain is proportional to stress, it will be seen that plastic yield is no slight matter.

In the reinforced column instanced by the author, it is somewhat strange to note that the stress on the concrete is assumed to decrease whilst that on the steel increases. One can readily visualise a theoretical basis for this assumption which is plausible, but of doubtful accuracy. If it be correct, which until proved by careful extensometer tests one would be inclined to doubt, the assumed changes in the relative proportions of loading taken by the steel and the concrete would appear to involve a change in the extent to which the two materials deform together, and therefore to involve the possibility of a tendency to microscopic or even macroscopic movements of the two materials relative to each other, which might involve that danger to adhesion which has been suggested by Mr. Vernon Crompton, and render doubtful the reliability of the usual assumptions in calculations. One will therefore await with some anxiety the report of the Building Research Department on this point.

But whether the relatively small proportion of the total load taken by the concrete in a column which has shortened in a year be increased or decreased would probably not greatly affect the increase of stress on the steel, which the author calculates to be from about 2 tons to about 9 tons per square inch. The yield point of the steel is not given, but 9 tons per square inch on long slender compression rods is serious, however

well they may be hooped. The beam tests are even more striking. In beam No. 1 the deflection under load increased from 0·3 inch to 0·82 inch at thirty weeks. Assuming that nothing happened to the adhesion, the stress on the steel would apparently be increased in the same proportion, *i.e.*, from about 6 tons to nearly 17 tons per square inch. This would probably exceed the yield point, and would therefore leave no factor of safety at all.

The author suggests that nothing which he has said has tended to throw doubt upon reinforced concrete; but he has scarcely added to our confidence in the material. One can scarcely take these results without experiencing a pronounced feeling of doubt, a doubt which has always existed in the minds of some engineers. It should be noted that the author points out that the stiffness of concrete increases with its increase in strength with age. As such increase of stiffness would cause the concrete to take up a correspondingly greater proportion of the total load, the peculiar advantage of reinforced concrete, in that its strength increases with age, would appear to be cancelled out.

Fortunately buildings are seldom or never called upon to carry the theoretical loadings for which they are designed. A loading of 70 to 100 lb. per square foot all over a floor, by no means an unusual assumption, even for small offices or living rooms, is often about 8 to 10 times the amount which ever goes upon it. Hence the usual factor of safety of 4, half of which is mortgaged to the necessity of keeping within the elastic limit, is in practice generally largely exceeded. This consideration would, however, scarcely serve to save a floor from being, if necessary, loaded up to the limits for which it had been designed. If stresses due to plastic yield are to be taken into account, it would appear to be obvious either that the cost must be increased or the factor of safety, as at present understood, must be revised.

It would seem that by using reinforced concrete with a maximum of concrete and a minimum of steel we are going the wrong way to work; and that structural efficiency as well as freedom, or practical freedom, from these disquieting distortions would best be served by using the maximum of steel, in the form of structural sections, individually stiff, and the minimum of concrete; as in a steel frame structure coated with concrete for protection. I have for several years advocated that the concrete which is put round the beams and members of a steel frame building for protection need not necessarily be ignored in calculating the strength.

May I instance the example of "filler" floors consisting of small joists with, say, 18 inches to 24 inches of concrete between them. Even in Dr. Faber's presence I would suggest that nobody yet knows exactly what is the strength of "filler" floors. It was, I believe, found to be necessary at Teddington to put down expensive plant to test them, because they were known to be so much stronger than any usual theory indicated. When calculated as a reinforced section, however, the theoretical and the actual strengths are in fair agreement. I have myself seen in the courtyard of the Public Trustee Building in Lincoln's Inn Fields, during a transport strike, a "filler" floor consisting of 6 inches of concrete between small joists, the span of which was, I believe, about 12 feet, piled to a height of about 8 feet with granite cills, without apparent harm or appreciable deflection.

There is a further advantage which steel frame construction possesses over reinforced concrete in that the latter, during its babyhood, must be tended very gently. During the first month of its existence it is very susceptible to vibration; and may easily be killed by shocks at which its more sturdy brother, the rolled steel section, would laugh. If, in addition, it is necessary to wait 12 months for a reinforced concrete building to settle down, then I would suggest that as practical men, using the term advisedly, in spite of Dr. Faber's definition, we can scarcely recommend it to clients as a suitable form of construction on extremely expensive city sites.

I would therefore suggest that the chief lesson to be learned from the paper is that the best form of construction for large buildings is structural steel framework, due credit being taken for the additional strength afforded by the usual protective concrete casing.

Dr. Faber has drawn attention to the fact that great force is required to move the ends of a large and heavy structure, and it is extraordinary how lazy large structures can be. When designing large road and railway bridges in which it is necessary to make allowance for end expansion, one finds that even well-oiled rollers are of little use on a large bridge, which will prefer to stress itself up rather than take the trouble to move, even under fast railway traffic. Hence it is necessary to place the ends of large bridges and viaducts on rocker plates. When Charing Cross Station roof collapsed, it was, I understand, found that the steel rollers which had been put in under the feet of the trusses were rusted right up. I did not personally examine them because the essential defect was quickly found elsewhere; but the absence of expected movement of roller bearings is similar to what one finds in bridge practice.

This appears to be allied to a similar curious phenomenon in the action of frame structures under load which is not, I believe, yet fully understood, *i.e.*, the tendency for that part of a frame adjacent to an applied loading to take the greater part of it without transmitting strain as would be expected over the remainder of the structure. During the war, when

testing the cantilever bodies of large bombing aeroplanes with tail plane loads of, say, ½ to ¾ of a ton, it was somewhat striking to find that the panels immediately next to the load took up nearly all the deflection, which appeared to be in dissonance with any known theory under which deflection would be expected to distribute itself more or less over the whole length of the fuselage. There was little time then for investigation, and all that one could do was to double the end braces ; but the experience was instructive as showing that there may be still unexplored fields of structural knowledge.

May I be permitted to join issue with Dr. Faber upon his definition of a practical man. Surely he is defining, not the practical man, but quite a different person, the rule-of-thumb man. In structural work we have three well-known and well-defined classes of practitioners. There is the mere theorist whose sense of proportion is defective because his knowledge is active in one direction only. The other extreme is the rule-of-thumb man, who can be as dangerous as the unpractical theorist. His sense of proportion is equally at fault because his knowledge in another direction also is atrophied for want of use. He is apt to fall into the error of believing that what he has done in one set of circumstances can safely be repeated when the conditions are quite different. The one thinks without working, the other works without thinking.

But between these two classes is that of the real practical man, who views every problem from all angles and gives weight to all essential considerations, theoretical or practical. If one may be permitted to make a small contribution to the polemics of the controversy in the Press as to whether bridges should be designed by engineers or architects, may I venture to suggest that the training and practice of an architect tends to render him essentially a broad-minded practical man with a proper sense of proportion. He is accustomed always to think in terms of solid geometry in at least three dimensions simultaneously : plan, elevation, and section ; drawing, specification and quantities ; strength, durability and price ; contract, extras and client, etc. Engineers are apt to specialise and, without in any way shutting themselves up in watertight compartments, to view problems largely in the light of the difficulties of their own particular branch. As one who has been compelled to practice both as an engineer and an architect, I would venture to submit that the mind or minds which can be expected properly to co-ordinate the information of specialists in the multifarious considerations involved in the production of a dignified structure worthy of a great city is surely the architectural mind.

Dr. FABER (in reply) : Mr. Munby asked when does plastic yield matter ? I think that depends very much on the nature and purpose of the building you are considering. If you have a concrete floor, it will gradually deflect slightly with time. You will generally not see the deflection with the naked eye, and, therefore, for all practical purposes, it does not matter. If you are dealing with very long spans and your beams are rather shallow and you are putting rather delicate machinery on it and a long line of shafting where many bearings have to remain straight in line, it may matter. But as long as one knows that these structures are liable to a certain amount of deflection with increased time it is easy for most people to separate out the cases which matter from those which do not. The important thing is to know your facts. In 95 per cent. of cases, the plastic yield does not make any concrete structure less useful than it otherwise would be. The stresses will be very different from those given in text-books and in the L.C.C. Regulations. That does not altogether matter if the structure is safe. It may make us impatient of working out whether the steel stress, according to L.C.C. Regulations, is 8,900 or 9,100, which some surveyors think important, when we know it is probably nearer 20,000.

As for panel pipes in contact with concrete, there is a reasonable question as to whether, with the constant expansion and contraction, they will remain in contact. I have no doubt that if the panel heating is treated in the way it is designed to be treated, the temperature variations not being excessive, that is to say, if you work your panel system not higher than 140° F., they will remain indefinitely in contact, because the stresses which are set up in the piping on the one hand, and in the concrete on the other, are lower than the stresses to which they are subjected ordinarily by all sorts of other causes. And there are many reinforced concrete buildings which have been up 40 years, such as the London General Post Office, and if there was anything very much wrong with the General Post Office it would have collapsed a good while ago. There are not even any cracks in it worse than 25 years ago, and I know of no justification for saying there is anything wrong with it. People get hold of the idea that the factor of safety must be 4, without knowing why ; and if, they find something in which it is not 4, they think it will fail. The provision in a structure of a factor of safety of 4 is intended to give a large margin of strength to cover the unknown, uncalculated things. Therefore, if as a result of further research we begin to take into account all sorts of stresses which we had not taken into account before, it is absurd still to require the same factor of safety. If you throw into the province of the known what was formerly in the province of the unknown, you do not need the same factor of safety on it. None of these things which have been discovered throw any doubt on the strength or stability of properly constructed reinforced concrete. A stress in that material which is

more than one quarter the ultimate stress does not frighten me if it takes into account shrinkage, temperature and all sorts of things which no one thought about or measured, simply saying, " It is covered by the factor of safety."

As to when to apply the heat in the " panel " system, I think the longer you can leave the system the better, because the longer it is left the stronger it becomes before the adhesion between the materials is stressed. If is safe to apply normal heat in the heating panel system at the age of five or six weeks, and, as most buildings take longer to construct than that, there is generally no difficulty in giving a good deal more.

As to cracking in plaster, that is a very difficult subject to speak of in a reasonably short time. I think the two important things are shrinkage of the plaster due to seasoning and drying, which tend to cause it to contract, and the adhesion between the plaster and its backing, which resists this contraction. If you have excellent adhesion, each inch of plaster will be so well fixed to its backing that it will move on it. When the plaster shrinks, the wall behind it will not do so, and the shrinkage puts the plaster into tension. If you have it on material to which it does not adhere well it will slide along to some extent, and cracks result. But if you are dealing with a backing of relatively good adhesion, then, instead of getting a few well-defined cracks, the plaster stretches without cracking. What is required is a plaster with a minmum of shrinkage and a backing with a maximum adhesion. And that is a reason why stock bricks form a better backing than some other bricks, which do not give the same adhesion.

Mr. Crompton asked about destruction of adhesion resulting from plastic yield. I do not think there is very much to fear in this regard when you are dealing with structures properly designed and properly constructed. As to shrinkage at high temperatures in reinforced concrete, it is true that at high temperature the structure loses water, and that introduces certain stresses between steel and concrete. But if you make calculations, you find the stresses which are set up are well within the margin provided by your ordinary factor of safety. If I found stresses beyond the yield point I should say the life of that structure becomes doubtful. If you can determine that these stresses, allowing for everything, come within the yield point of the material, I see no reason why the structure should not have a long life. And that is the case with the materials I have investigated, and it is the reason why reinforced concrete has in fact a long life.

The expansion and deflection of the beam at the fifteenth week occurred by reason of a change of temperature and humidity in the room. The readings for temperature and humidity were taken, but I did not show them on the slide because I thought it was already complicated enough.

The significance in my " obscure " paragraph is this : if you keep your joints flush and the outer wall surface expands because it gets hot, or wet, then obviously stresses are brought into play. If at all your joints you leave a little gap in which the surface can expand locally, brick by brick, the stress is to a large extent relieved brick by brick throughout the whole structure, and there is less tendency for there to be a movement of the structure as a whole.

I do not think stresses due to plaster yield will be destructive, but I think it makes the distribution of the stresses rather different from that given in the text-books of the present day. I do not mind that so long as people do not take present-day text-books as being too accurate. It is true that the plastic yield has to do with the gradual transition from jelly structure to a crystalline structure. When concrete is first cast, cement exists in a condition which has many properties similar to those of glue, and it is known scientifically as " gell." These structures have the property of expanding when they take up water, and shrinking when they give up water, just as glue does. As the concrete structure hardens with time, much of it goes out of the gell structure and forms a different structure altogether, where it becomes crystalline ; and as soon as it all becomes crystalline, the seasoning is completed. It is a process which takes place rapidly at first, more slowly later.

Some speakers have said we cannot wait twelve months for concrete to season. Nobody has suggested that you should. Until twelve months have elapsed, these slight changes occur, but, in 99 cases out of 100 they do not matter. What does it matter, generally, if a concrete floor deflects one sixty-fourth of an inch in the first months ? I would not suggest you should not use a reinforced concrete floor until it is twelve months old ; I did not make that point in the paper.

And it has been said, If this goes on, why use reinforced concrete at all ? To which I answer : you must use something, and I do not know of anything which is entirely free from objection. Timber has its obvious objections ; and a solid steel floor would be very uncomfortable. I do not think the disadvantages of a concrete floor are greater than those of other materials, and even an engineer has to be, I will not say a practical man, but he has to consider the relative advantages and disadvantages of things, and when he does so he will frequently consider that reinforced concrete affords the best solution to a particular problem.

I have not had the experience of the distortion of walls, which Mr. Sullivan mentioned as occurring in Canada, where there are immense ranges of tempera-

ture between the inside and the outside of buildings ; but I have had experience of great temperature differences between the inside and outside of reinforced concrete chimneys, and the two problems are very similar. There is no doubt that in such a case the chimney tends to divide up into three-foot lengths between the construction joints, and each section does some bowing ; when the chimney is heated the inside is longer than the outside. But there again the stresses can be calculated, and the results of such calculations all go to show that in a well-designed chimney they are safe. You may say, " Why use reinforced concrete ? " and I say, " Use anything you like, but whatever you use you will find there are objections." You will find a chimney 300 feet high heavy in brick work ; some brick chimneys require so wide a base that you cannot accommodate them on the space available. I know concrete chimneys only six inches thick which have several advantages. The thinner the chimney the smaller the differences between the inside and the outside temperatures, and hence the smaller the temperature stresses. There are many concrete chimneys of 200 feet or more which have done very useful service for 20 and 30 years, where no cracks are visible, and there is no reason to doubt that they will go on for many more years. If anyone knows a better material for that particular job, he ought to use it.

Mr. Wilson, quite correctly, mentioned that there are several things in my paper which are not new ; I hope no one will think I have suggested the contrary. What I have tried to do was to present together new facts and old facts in some systematic manner and show them in their correct relationship. One comes across all sorts of old facts which seem to bear no relationship and later finds that they are closely related.

It is true that buildings as a whole do creep, and there is evidence that concrete buildings gradually grow, because with every increase of temperature the ends push out a bit, and when they cool there is not a complete retraction. This is largely because the tensile strength is so much less than the compressive strength. So there is an increase in length, but not enough to require frequent revision of an ordnance map ! Concrete has a self-healing property. If in a concrete specimen there is produced a crack and the two portions are left in contact, in the presence of moisture they will grow together again. When a building cracks, a certain amount of the cement material dissolves out into the crack to mend it, and next time it expands the end pushes out still further. So that buildings tend to get bigger with the passage of time.

In reply to Mr. Wilson concerning lime mortar, it is a valuable property of lime mortar that movements can take place and the structure still looks much as it did. But the strength of lime mortar is very small, and if you are dealing with a retaining wall or other structure in which there are considerable stresses, especially bending stresses, there will be far greater economy of construction with cement than with lime mortar.

I was very interested in Mr. Lanchester's description of stone splitting by heat in India. I did not know about that, but in Norway they often split rocks by inserting a wedge some distance down and filling it with water, which in freezing expands and splits the rock.

Mr. Dangerfield asked about the mortar between the concrete blocks making it behave as a monolithic structure. Certainly that happens, particularly if you use strong mortar ; with lime mortar it would happen to a less extent, because each joint would form a little expansion joint, and there would be movements taking place which would not be objectionable. It is a question of degree, and you do not want to carry it too far or you will get a draught through the joints !

In reply to Mr. Waldram, in the reinforced concrete column I mentioned, the reason the concrete stresses is reduced is because the load on the column is carried partly by the steel, and if the concrete shortens by shrinkage the load will bear more on the steel. As the steel carries a larger portion, the concrete would carry less.

Mr. Waldram awaits the report of the Building Research Committee with anxiety. I do not. I await it with interest. Nothing would fill me with much anxiety except the discovery that some old reinforced buildings were collapsing, or showing signs of being about to do so. These researches go to explain things we did not know, they do not tell us that a structure which has been doing its work for forty years is no longer capable of doing so. I have not found stresses dangerous due to the things I have been discussing tonight. So long as the General Post Office, which I think was built in 1905, goes on so well, one has no hesitation in building the Horticultural Hall in the same way. I do not think research work will prove that those buildings are dangerous. I do not see why we should not recommend reinforced concrete to our clients for a particular job, because for many purposes it is the right thing. In the country, frame buildings are often made of reinforced concrete because it is more economical, and in the City steel frame structures are often to be preferred as being more quickly erected and because most of the work is done at the works. I agree as to the strength of filler floors, but the example of test given is not conclusive, because if you have stuck sills up 12 feet high on a 12 foot floor there will be an arching action, and it is doubtful whether the floors will get more than a small proportion of that load.

Review of the R.I.B.A. Prizes and Studentships, 1929

BY OSWALD P. MILNE [*F.*].

[*Read before the Royal Institute of British Architects on Monday, 21 January* 1929.]

WHEN the President nominated me to be the critic of the designs submitted for the R.I.B.A. Prizes, I opened the dictionary to see what my functions really were, and I read "one who pronounces judgment, a censurer." Well, that may be my proper function, but it is one I do not mean to sustain. I would rather hope, in the short time at my disposal, to give to the competitors some light as to the general reasons why one design is successful and others fail. I would hope that words of mine may be helpful rather than censorious.

I did not think my task would be a light one and when I saw the large number of drawings that these competitions have brought forth—that fill not only this room but the next—I foresaw that anything I could say except of the winning or mentioned must be on broad general lines rather than anything in the way of detailed examination of every set.

I want to congratulate each one of the students who took part in the Homeric contest. The general standard reached this year is a high one and for most of the prizes the competition has been keen, although for the Owen Jones the Grissell and the Saxon Snell it has been negligible. I am sure most of the competitors have gained something by entering and carrying through these schemes of theirs. There has been much work put in, hard work, midnight oil has been expended, I have little doubt, but on the whole it is intelligent work. They have at least the knowledge that they have disciplined themselves to carry a work to completion. It is comparatively amusing to make the first rough sketches for a scheme, but to carry it right through to the finished drawings is a different story and it is that application, study and hard work that means success in the long run. I am perfectly sure there is no short cut to really fine work; it is only made possible, only accomplished by perseverance, definite study and by learning all the groundwork of the job thoroughly.

You all learn in these contests how to take the decision of the umpire as you would in cricket—smilingly, if you can, silently, if a smile is not possible. You accept the sometimes perhaps queer seeming ways of the jury—who, by the way, do their part of the job conscientiously and according to their lights—Later you may enter for open competitions where you are up against all comers and as the disappointments that fall to the lot of all architects must be many, it is well early to accept the rules of the game. In these larger competitions all you know is that your design has been successful or, perhaps more often, that it has not, and the reasons for the assessors' choice is seldom revealed; but, at least, I am standing here and trying to explain the vagaries of the jury's award.

I will at once embark by taking the Tite Prize and Victory Scholarship. These are competitions in design, subjects to bring out the students' powers of imagination and architectural conception without too much restraint of mundane considerations of mere cost. In both these competitions the first sketch has to be done *en loge* in 12 hours, while the second stage is a development of this sketch. This, while giving some advantage to the quick thinker, has the merit of urging the student to stick to essentials and do some clear thinking in the early stages of his design.

The Tite Prize.

The subject for the Tite Prize this year was a Private Yacht Club on the Mediterranean. I do not think I need read the programme at length here. The competitors will have the conditions in mind, whereas for general appreciation of the points of the designs it will be enough to say that the club was of an exclusive nature, situated on a margin of the sea—apparently a tideless sea!—on ground sloping to the beach with an inclination of 1 in 10. An attractive subject with room for skill in dealing with the falls and the lay-out of terraces.

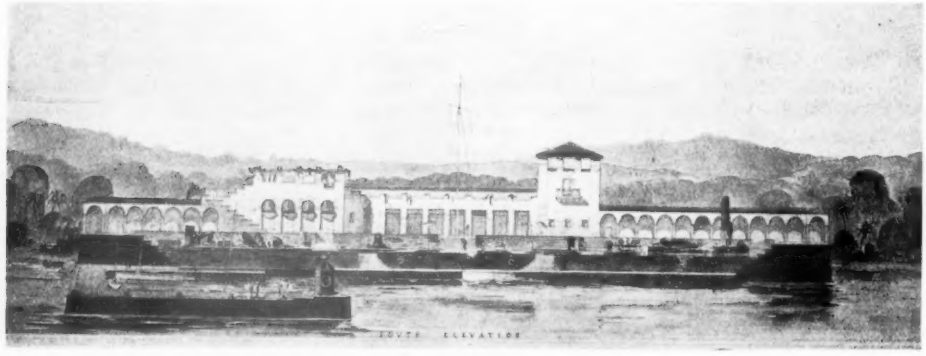
It will be remembered that the Tite Prize is for junior students and is awarded for the study of Italian architecture, a condition that somewhat limits the scope of purely imaginative design, and that has rather a Victorian flavour about it. We like, in these days, to think that we do not particularly design in this manner or that, but that we meet modern conditions in modern ways. However, it is perhaps a salutary reminder to the young architect that before he can design in a successful modern manner he must necessarily do the hard work of studying and understanding the principles that underlie all fine architecture, and there is no better way than by full acquaintance with the great architectural styles of the past.

Here, then, is a competition where an evidence of taste and grasp of Italian architecture will weigh with the jury as much or more than merely practical planning.

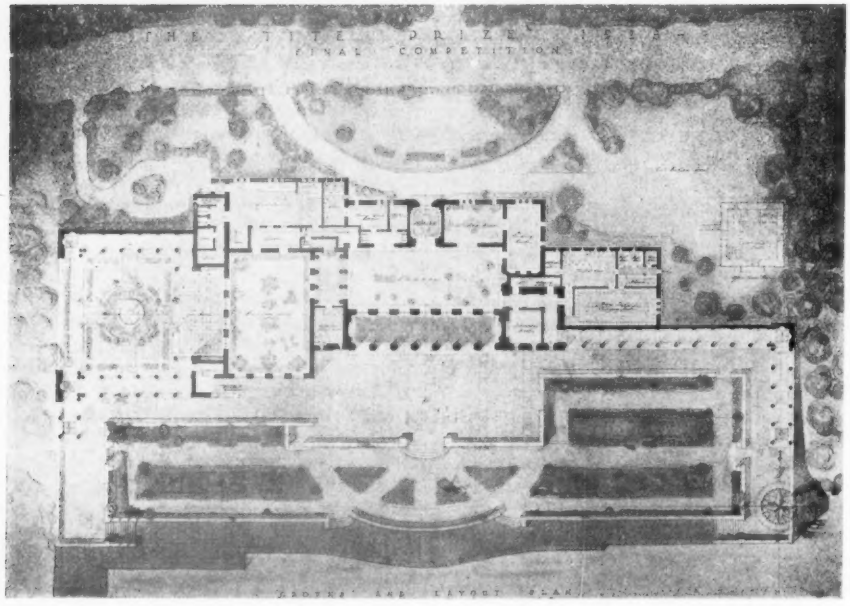
Twenty-seven sets of designs were sent in. The general standard is good, and many are finely presented. A number of the competitors, unfortunately, failed to keep the condition that they must adhere to

the lines of the sketch done *en loge*, and very materially departed from their original scheme in the final drawings and were accordingly judged by the jury to be

The sad reflection on this is that many in departing from their first conception have not improved their design, but rather the reverse. However, it may be



Elevation



Ground and Layout Plan

PRIVATE YACHT CLUB ON THE MEDITERRANEAN. By Wm. Crabtree. [Awarded the Tite Prize]

hors concours. Those who disqualified themselves thus were No. 7, " Toggels " ; No. 8, " Egwert " ; No. 10, " Bantu " ; No 15, " Flops " ; No. 20, " Nyria " ; No. 21, " Spalato " ; No. 22, " Bellerophon " ; No. 23, " Xmas " ; No. 25, " Buddha " ; No. 26, " Tento."

some small consolation for these competitors to know that none of them would have taken the prize, even if they had not been *hors concours*.

The proper solution of this problem, broadly speaking, would seem to be good open planning with easy connection between the various club rooms, plenty of

outlook towards the sea. Planning can be one or two floors, but the kitchens should be on the same floor as the restaurant. It is now generally recognised that for good service this is desirable.

" Worse " [Mr. William Crabtree] appears to be better than his neighbours and is awarded the prize. He wins the day because he has well grasped the programme and his lay-out is imaginative, making good use of the slope of the ground. In plan his main rooms are well disposed facing the sea. His kitchen and smaller club rooms are well placed. He makes no attempt at symmetry in plan, and this, probably, is the right scheme for the building with its unbalanced requirements, thereby he gains picturesqueness for this isolated site, evidently amid natural surroundings. It is so usual for the symmetrical plan to win a competition that I am glad to see the jury have not been swayed by mere pattern. The elevations are a little ragged and unhappy from the number of motifs employed. The entrance, of which a charmingly drawn detail is sent, is heavy in character, suggesting the entrance to a monastic building rather than to one given to pleasure and recreation.

" Leo " [Mr. J. L. Martin] gets an honourable mention. He sends a delicately drawn set which has some nice points about it. The building is well grouped with an attractive outline. The value of the tower is problematical. There are mistakes in planning, such as putting his kitchens below, and the lighting of his restaurant towards the sea is not very happy. His first sketch was better in this respect. The pergola crossing in front of the lounge windows would be an annoyance. The drawings are delightful.

" Simple Simon " [Mr. C. St. C. Oakes] also gets a mention. His scheme is formal and attractively simple in form, but perhaps it lacks interest in outline for such a site. Is the planning on two floors the right scheme for a club of this sort on an open site ? The formality of the plan has led to difficulties which are surmounted by providing an unduly large committee room. The elevations are simple and direct but the building loses something of its club house character by the restricted and domestic appearance of the first floor windows of the restaurant. The drawing and presentation are excellent.

" Como " [Mr. John F. D. Scarborough] gets a mention. His plan is perhaps the best submitted. His conception of planning with fine open vistas is the right one ; everything is direct. The disposition of the smaller rooms and changing rooms is good. The kitchens are too cramped. If " Como " could have carried out the broad feeling of his plan into his elevations he would have probably been a winner. But here he seems lost. He is confused, he tries to create balance where there is no balance, he goes to pieces.

" Salamander " [Mr. F. R. S. Yorke] also gains a mention mainly in that his design shows a real understanding of Italian architecture. There is grace about the elevations and a charming use has been made of that characteristic Italian feature, the loggia. The rounded terminal blocks are unusual and pleasing. How the roofs are to be managed is not apparent and its long internal gutter would be a troublesome affair. The plan with its featureless long corridor would make for dullness and the main axis of the hall and lounge want opening up.

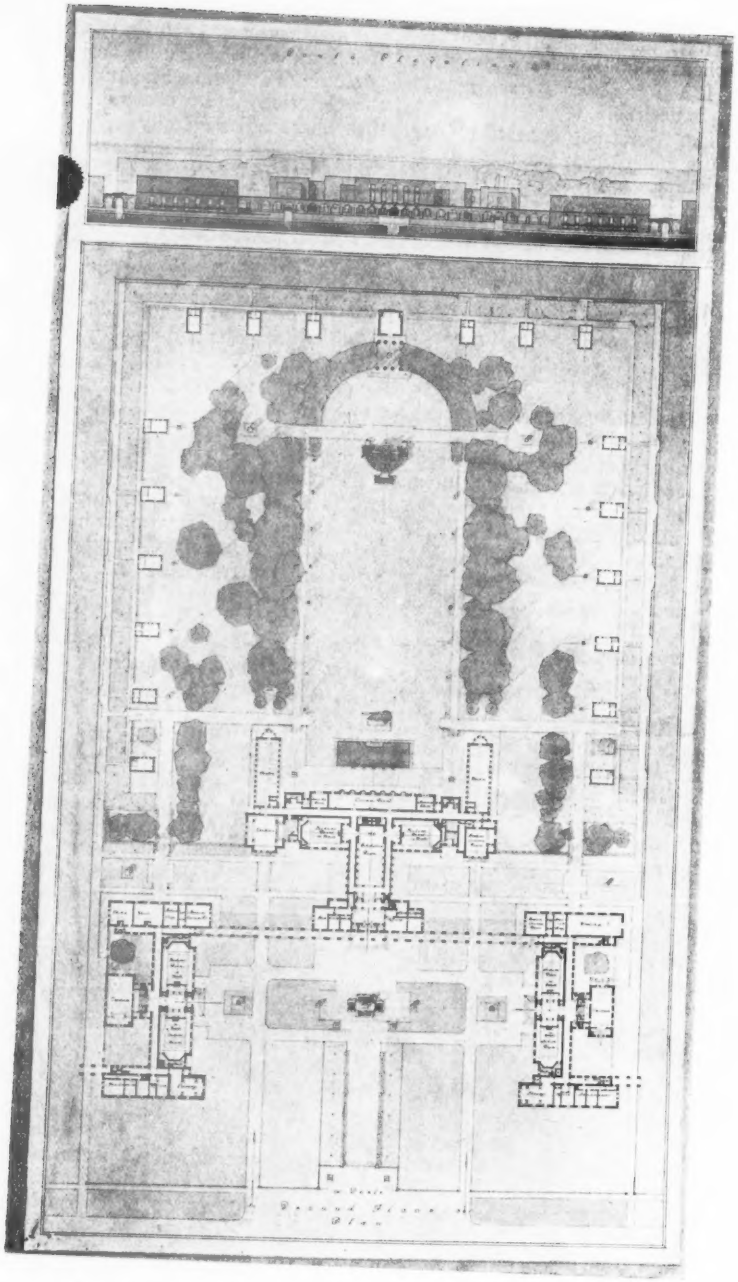
Of the 23 remaining sets, I have found much to interest me, and I should like to have gone through each one with its author, showing him where I consider he failed. That is, however, impossible if you are to get home to-night. So I must be content to name a few of the more common faults. In planning, many fail from lack of connection and opening up between the parts. " Qwertyu," " Wuf," " Bantu," suffer in this respect.

It is a common fault to invent difficulties in planning that clearer thinking might have avoided, and then to do strange contortions to surmount the difficulties. Some competitors, I think, approach a problem with the idea that the simple direct solution will not do, and that the jury will look for something strange and bizarre. Whatever may be their process of thought, they should train themselves to think first and logically of essentials, and only after they have arrived at that can they hope to design a *tour de force*. " Tento," " Bohun," " Xmas," "Vuil," " Toggles," are of this order.

Another common fault is to put too many motifs into the elevations. " Wannah," and " Xmas " are particular instances. " Egol " illustrates another kind of mental attitude that leads to failure. He does not do too badly, with the exception that his elevations look more like a villa than a club until he comes to his restaurant on the first floor ; this is a fine apartment, facing the sea, but it is lit with comparatively small circular windows so high up that no one dining could see out. Why are the members deprived of this view ? I suppose because " Egol " had some preconceived form of elevations in his mind, or did he wish to make the diners feel that they were still on board ship ?

Victory Scholarship (13 Sets submitted).

The programme for the Victory Scholarship, which is for more advanced students than the Tite Prize, was a Faculty of Fine Arts in a University. This department was to be an offshoot of the University Campus. The site was defined as on the axis of a main avenue, it sloped slightly upwards to the rear, and there were fine trees on the site. The details of the programme purposely left the competitor much freedom as to his lay-out, and as to the choice of style for



FACULTY OF FINE ARTS IN A UNIVERSITY. By Miss Betty Scott
[Awarded the Victory Scholarship]

his buildings. A list was given of the required rooms or parts within each building, but disposition and size of these were entirely left to the competitor's discretion. I need not read the programme ; all I need say for your general understanding of it is that the building had to have three parts—a school of architecture, a school of painting, and a school of sculpture, and each part had its working quarters, its lecture rooms, its common rooms, etc., and, in addition, its exhibition quarters, its galleries, etc., for the display of actual completed work. In addition, a number of small individual studios in the grounds had to be provided.

Thus one had an attractive but somewhat difficult architectural proposition, only to be solved properly by clear and logical thinking. There was the ordinary problem of proper planning, and in addition a solution had to be found to the grouping of the parts on the sloping site so as to form a pleasing whole.

The winner of the first prize is " Seven," who proved to be Miss Betty Scott. I would here remark that if you wish to be successful in architecture, it is a good thing to be born with the name of Scott, and secondly, that the men must look to their laurels in fields by long traditions their own. Women have entered the lists in all professions, and in architecture at least they are showing that they have gifts of architectural imagination. We shall look forward to see how they succeed in the more exacting fields of practice. No competitor has arrived at an ideal solution of the problem, but " Seven " scores by an orderly and workable plan of each building. The entrances are good, the circulation is well thought out, the arrangement of the parts is eminently practical. She makes good use of the site in the arrangement of her garden and the placing of the individual small studios, and by her conception of the relation of her buildings to the other university buildings. The connection of her own buildings, however, is not very happy. The greater mass of the centre building is thrown back behind the central projection, and would, in actuality, leave a weakness of grouping, and she has, I think, felt this herself, and has tried to surmount the difficulty by linking the centre projection to the sides by means of a corridor. This, however, rather emphasises the trouble by putting the main mass of the centre building behind a low screen.

The elevations are treated in a simple, direct, modern manner, relying on mass and skilful pattern of window rather than on accepted architectural ornament. They do their job without fuss. The details, which seem to imply a concrete construction, leave a sense of baldness and meanness, a quality from which concrete buildings are inclined to suffer.

" Conquered " [Mr. E. G. Gardner] gains an honourable mention. His plan is workmanlike but is not so good as the preceding one ; there is much corridor, but the circulation is lost in lecture rooms. The elevations are of the same genus as the last, no concession being made to anything but square form, but here the patterning of the windows is unhappy. The dotting of some of the small studios in front of the main building is a mistake that this student tries to disguise by hedges.

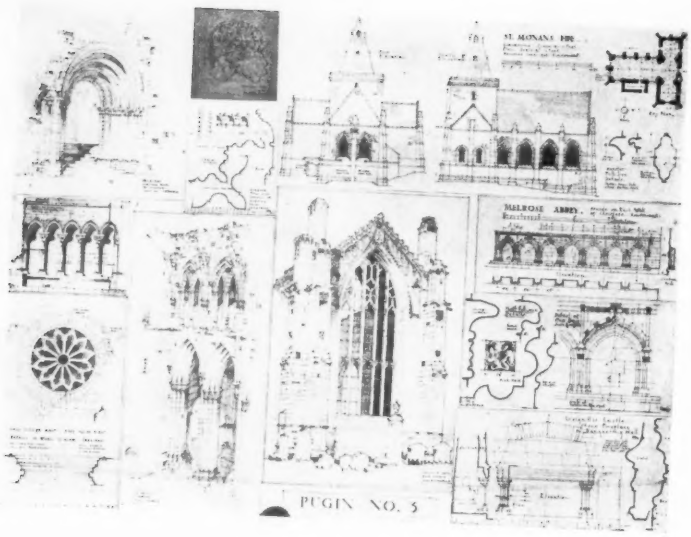
" Mark " [Mr. George A. Goldstraw] is also awarded a mention for an interesting scheme gaining much from its quiet and dignified elevation.

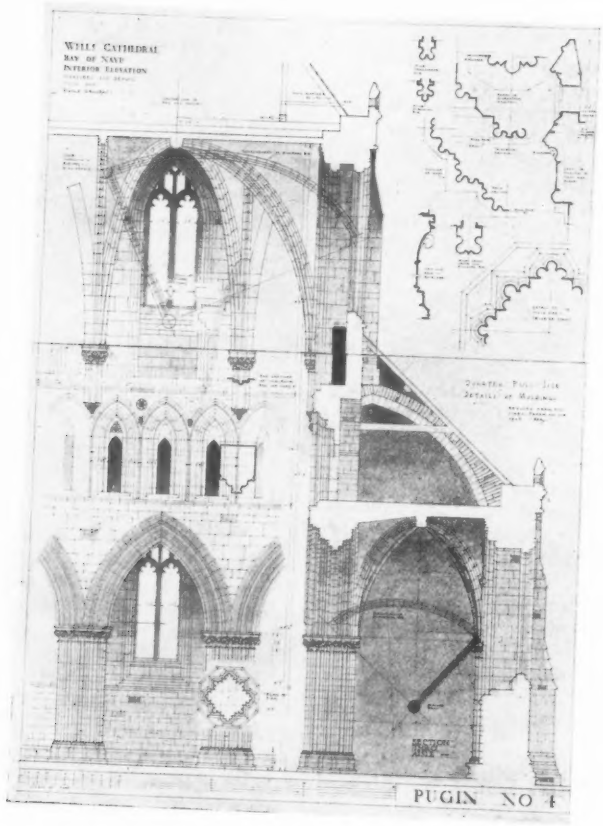
" Mark " has had an idea he has masked all the business part of his buildings by the galleries, and what he could not do with galleries he did by contriving extensive vestibules. This must be a wealthy university. When all is done, the dog-legged antique gallery is not happy for its purpose. The approach by an immense flight of steps, which keep any wheeled vehicle from nearing the door, is magnificent rather than practical. The corridors between each studio leading to models room is extravagant, but his general circulation is excellent. The joining of the buildings, if the narrow forecourt could have been avoided, makes for unity.

Of the remaining sets, I can only say a word. " Duo " appears to be a disciple of Corbusier, without much understanding. His engineering is impractical and without imagination in arrangement. The building as an efficient machine is an idea, but human beings, besides being efficient animals, are creatures of emotion, and any building to satisfy must recognise that fact. They are too magnificent in plan and too dull in elevation.

" Palam " has points in his scheme, but there is a weakness in the grouping of the side buildings with the centre one. " Merg," too, lacks cohesion, and the spotting of the little studios between the gaps between his buildings is unhappy ; he is over-generous of corridor. " Ovolo," " Quis," and " Nigs " take their buildings to the far end of the site, thus detaching them far from the campus, a questionable proceeding. " Ovolo " is disjointed in all respects, he dots his small studios along his approach and then proceeds to grow hedges to hide them. " Quis " plans compactly, and there is something attractive in his honest placing of his three rectangular buildings. " Nigs " tries to give dignity to an impossible forecourt by naming it " Court of Honour." The cliff-like cuts between his buildings are unfortunate. " Dawel," like " Mark," has the idea of masking everything with his galleries, and makes them magnificent, and there is something out of proportion as well as unarchitectural about the immense corridor to his studios. The approaches to his working parts, which are thrown to the back, are not good.

We now come to the Pugin Studentship, which is





DRAWINGS. By R. H. Matthew. [Awarded the Pugin Studentship]

given for the study of mediæval architecture in the British Isles. The evidences of this study are judged by measured drawings and sketches submitted. The Council attach importance to measured drawings, but a general evidence of intelligent study of the subject is looked for.

Ten sets were submitted, and a number of them reach a standard of excellence that in many a normal year would have taken a prize. I congratulate the students on the high quality of the work. There is only one small set that does not reach a satisfactory quality.

There was some difficulty among the best two or three in finding the winner, but R. H. Matthew takes the palm for a beautifully drawn set, really first-rate work. His measured work is finely presented and intelligent in the selection of subject. His sketches are sensitive and have a great charm. I need say no more. Mr. F. R. Cox, who gains an honourable mention, runs him close indeed. His work, both measured and free hand, is admirable. He shows understanding of his subjects and the touch of an artist. He sends some good studies of coloured work, both of wood and stone, and his drawing, Dorchester Abbey, are fine drawings of a fine subject.

Of the others, K. A. Begg gets near the top. J. L. Martin does good work and shows a fine free touch in his sketches of the Tower, which evidently attract him. R. F. Jordan sends a carefully drawn set, but lacks the inspiration of the winner. Kininmonth and Beattie have worked hard and send a workmanlike set, but have not the same facility of touch in sketching as their rivals. T. A. Brittain draws well. F. W. C. Adkins has some admirable studies of Tracey, and touches my heart because he has measured East Anglian subjects that I once laboured to measure without the careful success that he has displayed. The clumsy method of mounting has not helped him.

In this competition, whether you win or not, one feels that you have derived much pleasure and benefit from hours spent in travelling and study. Though nowadays the study of Gothic architecture is not very popular, I believe that if it is studied with insight as to how the form was the outcome of the needs of the day and the ornament a development from the necessities of structure, you have a key to the essence of all good architecture.

The Owen Jones Studentship.

Here one regrets the lack of competition, only one set being sent in. I, myself, am sorry that it was not granted the prize. It is a most carefully drawn set, showing some sense of colour, but I can well understand the decision of the jury, for this competitor shows a lack of clear thinking and no power of selection in her motifs. She wants (as many of us did when we were young) to put in every idea we had. This leads to confusion in the result. The landscape on the main walls shows a sense of decorative treatment and composition, but has no relation to the patterned ceiling and the brilliant line of colour immediately above the delicate sky kills the landscape. Some day, when this student has learned to restrain herself, we shall see her doing some good colour work.

The Saxon Snell Prize also only attracted one competitor, and was not awarded, as the evidences of knowledge of the subject were not considered to be up to a required standard.

The Alfred Bossom Travelling Studentship is awarded so that the winner may study commercial architecture in America, and the subject set is to test the ability of the student on a really practical basis, namely, to make a design which is good architecture, but which meets at the same time every practical consideration of utility and finance. The subject set this year was a scheme for a block of flats in the best residential quarter of an important city; particulars and cost of site were given and a good many details as to general requirements. The competitors had to work out their scheme so as to meet the conditions and also to show how the whole business of financing the scheme would work out. This was a thoroughly practical problem, of the kind that faces architects more and more each year.

In addition to the gold medal, silver medals are awarded to the best set sent in by each school of architecture or by unattached students.

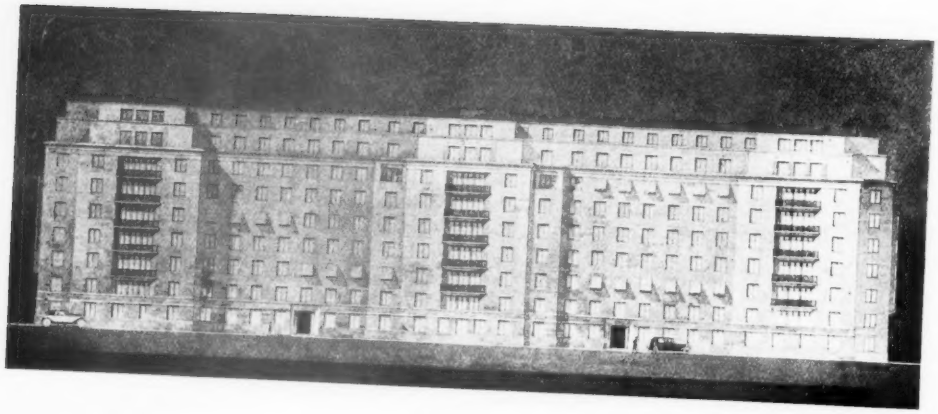
Speaking generally, all the candidates under-estimated the cost of their buildings 3s. per foot cube would be a reasonable sum to allow for a building of this sort. None of the designs would really meet the practical problem of finance, nor do the competitors show clearly how the early stages of finance would be met. A return of 10 per cent. would be reasonable on a scheme of this sort, and on their own showing few competitors meet this. The fact is that none have shown a real grasp of flat planning of this sort; they have failed to plan tightly enough.

"Bruno" [Mr. Frank Scarlett] wins the gold medal. His good points are (1) a good report; (2) that he plans almost without areas; (3) that he gives a good choice to a wide number of tenants in the variation of his flats; (4) he plans his suites well; (5) his elevations show restraint and he gets interest by his grouping of balconies.

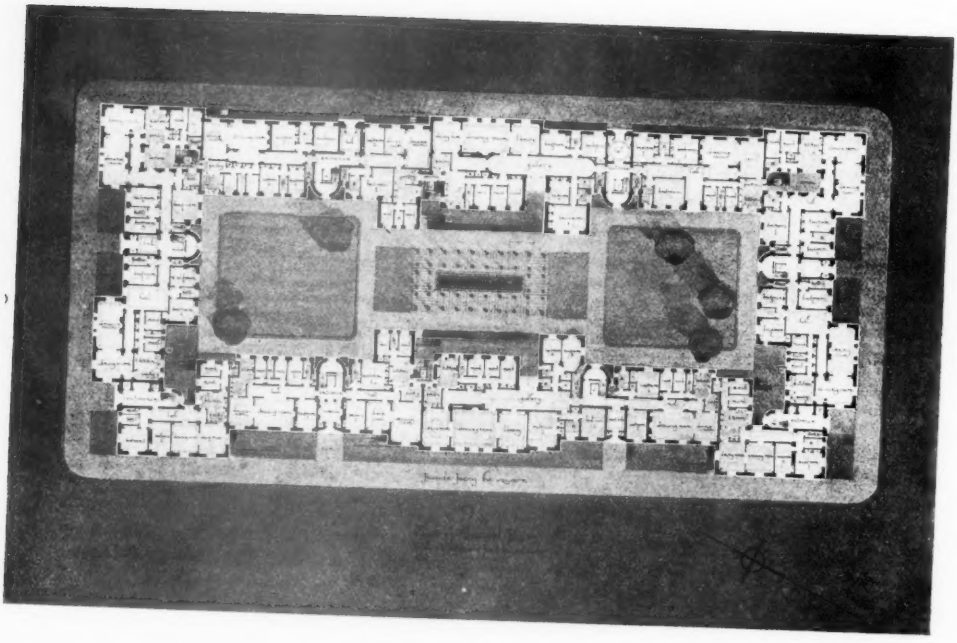
His weak points are (1) the breaking up of his plan by projections, etc., especially in the court. This is expensive, and his cost given at 2s. 4d. per cube foot is too low; (2) galleries are excessive; (3) kitchens are inadequate.

"Skyros" [Mr. T. W. Snailum] gains a silver medal. Has a complex for recessing his main front—an expensive amusement without due gain.

His elevation is interesting, but the windows on the angles of the recesses would give a terribly weak effect.



Elevation



Ground Floor Plan

BLOCK OF RESIDENTIAL FLATS. By Frank Scarlett, B.A. [*A.*]
[Awarded the R.I.B.A. (Alfred Bossom) Travelling Studentship]

He has a good point in his garages under.

His corridors are long and unlit in some cases, and his plan suffers from badly shaped rooms. (Bedrooms 22 by 11.).

2s. 9d. per foot cube is too low an estimate.

" Spes " [Mr. A. A. V. Campbell].—Makes an attempt to get a large number of flats facing the square (noted as desirable in the conditions) by opening out his central court to the square, but then in order not to lose too much space he puts a lower separate block into the gap. The result is that he gains neither world in an attempt to get the best of two. His entrance halls are inadequate ; his long corridors (in some instances 120 feet) are generally unlit ; he has some sense of a good suite of rooms ; his elevations are quiet and attractively conceived, but his outside effect of windows is done at the expense of the inside effect in the rooms, and the rooms are often under-windowed, and his cube per foot of 2s. 2d. is too low.

" Twohoots " [Mr. Johnson Blackett] is lucky to get a silver medal. His planning with six internal courts is on the wrong lines. His little indents at the entrances make driving in impossible, and are just the sort of thing one has not to do. His balconies shut out the sun and light from flats below. His price 2s. per foot cube is too low. " Knightsbridge's " planning with three small internal courts is on the wrong lines.

The Grissell Gold Medal is given for the encouragement in the study of construction. The subject set was a large town house in London. The client was a man who entertains and who wished to display a small collection of pictures and manuscripts. Site, certain conditions as to this and accommodation required was given. Two sets only were submitted.

The jury in awarding this prize would no doubt give first consideration to the matter of construction, but it is difficult and indeed wrong to separate this entirely from problems of planning. It is useless for an architect to construct anything if he is doing it on the wrong conception of plan. Both sets submitted made such a bad business of solving the problem set from a practical point of view that the prize was not awarded.

" At Last " [Mr. L. M. Chitale] was given an honourable mention for building his house, as far as construction was concerned, in a reasonable way, though his jointing of stone leaves a good deal to be desired, and when he comes to the cornice he gives up the unequal struggle altogether.

In planning he is not successful. One point alone, he arranges his picture gallery so that there is no space to hang any pictures. " Polaris " lands himself in so many difficulties in his plan that eventually he has no good room in his house, all are awkward in shape or small, and his corridors are impossibly narrow.

Both these competitors make the mistake of trying to do something peculiar instead of going for the direct and obvious solution of the problem. Nearly always the simple, direct scheme of plan is a winner. Juries, no more than clients, want some strange cleverness or *tour de force*. Surely the right plan here on a comparatively narrow frontage would have been that of the ordinary town house—the front door to one side of the elevation.

Of the Essay Prize I shall only say a word. The competition is small, only three essays being submitted. I regret this. It is often felt, and it may be true, that the art of literature is a form of expression that seldom goes with the construction gift, but none the less to write good English and to be able to express oneself well is most useful to the architect, and is an expression that he should cultivate. You may any of you occupy that chair where a felicity in the use of English must be invaluable.

The three essays, in a word, might be summed up as follows :—" Tradition" [James F. Howes], who gains the prize : a careful and interesting study of Bell of Lynn. " Inmor," who writes of architecture of the nineteenth century : disordered. " Olav," who treat of the architecture of Norway : uninspired.

" Tradition's " is a readable study of a slight subject. " Olav " is also readable, but falls into rather a dull catalogue of contemporary architects' work. " Inmor's " essay has more colour in it than either of the others ; his use of English leaves much to be desired, his flow of ideas lands him in strange disorder. He expresses himself in a surprising and loose way. I cull two examples :—

> " The century had been dominated in succession by Stephenson, the death of the Prince Consort, and the Darwinian theory. These three had knocked the romance out of life."

And again, *apropos* of nothing in particular :—

> " The King (George III) worried by his sons and getting on in years, was subject to fits of boredom. He did not like carpets . . ."

And so once again these contests have been fought out. The winners will have their names inscribed honourably on the lengthening lists below other winners, many of whom have risen to fame in their profession. We congratulate them on their success, and we hope they may greatly enjoy their travels and the studies they will be enabled to make, and to those who do not win I would wish better luck next time, and would say, " do not be down-hearted." It is not always the winner of the students' competition who is the winner of the prizes in life.

For my own part, I am only too conscious that it is easier to pick designs to pieces and point out weaknesses than it is to achieve one that is fine. All criticism is bound to be largely an expression of personal taste, and I am conscious of many shortcomings in this brief review.

Vote of thanks to Mr. Milne

THE PRESIDENT, MR. WALTER TAPPER, A.R.A., IN THE CHAIR.

The RT. HON. LORD DANESFORT, K.C., in moving the vote of thanks, said :—It is not an easy task to distribute well-informed, kindly and intelligent criticism on a large number of works of art, some of which have been projected on to the screen for us to-night. But I am confident you will feel that Mr. Milne has done his task with consummate ability and with great impartiality and clearness and, may I add, with a sympathetic appreciation of the works which he was called upon to consider and, so far as necessary, criticise.

I was very glad to learn from him that the general standard of the works which were submitted for examination was extremely high. And there was one other general remark he made which appealed to me, and that was that in awarding these prizes the jury have regard more to what is essential and practical than to what is strange and bizarre. I fear that in some branches of art the strange and bizarre varieties receive more attention than, I think, an intelligent appreciation would award them, and I am glad to know that your jury, at any rate, does not adopt that particular form of appreciation.

I may perhaps be allowed to congratulate competitors upon having, as Mr. Milne said, reached so high a standard, and to congratulate especially the successful competitors upon the results they have achieved, and to express the hope that in their after-life these initial successes may be followed up by further and greater successes in the practical work of life.

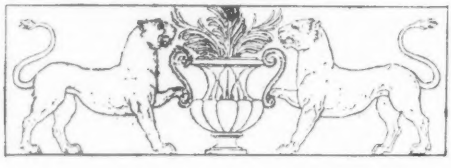
I note, in accordance with what I believe is the general trend of affairs now, that among the names of those who have been successful is a woman's name in a prominent position. Well, it is not surprising, and I suppose it is difficult for any of us who are not prophets to anticipate what eminences women may not reach in the future. I speak under correction, but up to now, I believe, women have not been very constant competitors in these competitions; but that one should have attained success to-day is an anticipation of what may result in the future.

Before I sit down I should like to make one or two general observations which have occurred to me, entirely as an inexpert person. Architecture appears to me to occupy an almost unique position amongst the arts. Architecture is an art which is absolutely essential to the needs of civilised man. Painting, sculpture, music and the drama, in their highest manifestations, afford—and rightly afford—some of the highest forms of education and of pleasure to cultivated intelligences, and, in a lesser degree perhaps, to the less cultured. But—and I hope when I say this I shall not render myself open to the charge of gross Philistinism—they are not absolutely necessary to the preservation or the maintenance of human existence. Indeed, some forms of painting, sculpture and music in their more modern manifestations do not appear to me otherwise than degrading to the public taste. Cubist paintings are not, to my mind, objects of beauty, and I devoutly trust that jazz music may not be a joy for ever. On the other hand, architecture, as I have said, appears to be one of those things which, ever since man ceased to live in caves and hollows of the earth, are necessary for civilised existence. You are engaged in producing buildings for human habitation and, I am glad to think, far more sanitary and satisfactory buildings than were produced in the somewhat recent past. You are also engaged in designing and carrying out buildings for ecclesiastical, for educational and for public purposes which are of absolute necessity to our present schemes of life. In so doing you have first of all to be possessed of natural aptitude, powers of imagination, of invention; and secondly, you have to have the highest forms of technical and scientific education. You have not only to build well, but you have to build so as to produce objects of beauty, symmetry, dignity and harmony.

Remembering these things, I was extremely glad to welcome the Bill recently introduced into the House of Lords by Lord Crawford for the registration of architects. The Bill has passed successfully through the Lords, and has now gone to the House of Commons, where I trust time may be found to carry it into law. When it is carried into law, of this I am confident: that not only will it raise the status of the profession and the quality of architecture, but it will be to the greater advantage of the public whom you serve.

Mr. W. R. DAVIES, C.B. [*Hon. A.*] in seconding the vote of thanks said :—I do not know whether architecture is unique, but I think it must be unique in the very homely way in which this matter of the principal prizes for the students aspiring to the profession is conducted. It always gives me the impression of benevolence—if I may so put it—on the part of senior members of the profession to the junior members which, I think, must be unparalleled in any other profession.

The PRESIDENT then put the vote of thanks, which was carried by acclamation.



Society for the Protection of Ancient Buildings

BY JOHN SWARBRICK [*F.*].

It has always been a pleasure to read the annual reports of the Society for the Protection of Ancient Buildings, and the fifty-first, which was issued in June, 1928, was not an exception to the rule. It was, in fact, one of much interest. There was a time when people were often disposed to regard the preservation of ancient buildings as an innocent diversion for the unduly sentimental; such a view it may confidently be said is no longer held by our leading men of public affairs and by those to whom we can wisely look for guidance in matters of general policy. Probably no statesman has borne witness to their significance more eloquently, by both word and act, than the late Lord Curzon of Kedleston. It is now generally agreed that ancient buildings have a most remarkable value from an educational point of view. Without them, how imperfectly could we appreciate the changes that have taken place in our social life; how little could we understand the glowing, irrepressible enthusiasm and the grandeur of the ideas of the great church builders of the mediaeval period. Without our ancient keeps and castles, what an imperfect notion we should have of the forceful, determined, empire-builders of the past. Without our ancient domestic buildings, how inadequate would be our picture of sumptuous Elizabethan hospitality, Carolean munificence, or of the courtly manner in which the peers and great landed proprietors of the Georgian era lived, uncomfortably, and far too spaciously, but with pomp and circumstance. Literary pictures and records are most valuable, but the kind of evidence that can be appreciated by the eye conveys a deeper, more perfect and permanent impression. Moreover, colour, size, proportion and artistic merit are things that the eye can alone assess. The opinions of another, however graphic and realistic, may be entirely misleading. We must therefore regard the Society for the Protection of Ancient Buildings, the Ancient Monuments Society, the Council for the Preservation of Rural England, the Council for the Preservation of Rural Scotland, the Oxford Preservation Trust, the Cambridge Preservation Trust, the Sussex Archæological Society Trust, and all similar bodies, as institutions that demand our warmest support, and bodies in which we, as architects, should take a very special interest. It would perhaps be fortunate if all such bodies could be associated in some more directly official way with the Royal Institute. The present arrangements may work well, but we should look to the future and devise means of permanent co-ordination and control.

In the past, the practice appears to have been to recommend the owners of ancient buildings to employ certain specially qualified architects to deal with all works of reparation. Doubtless, this has, in the majority of cases, proved the best possible course of procedure. We have, however, at the present time, and shall have, in the future, to deal with conditions widely different from those that originally prevailed. Now, there are numbers of fully qualified architects of considerable ability in all parts of the country, who could well do all that is essential, if controlled by advisory architects with special experience. Fortunately, these facts appear to be fully realised by the active Committee of the Society for the Protection of Ancient Buildings, and there is evidence that it has adopted the wise course of merely giving advice to local architects in certain cases. Another highly commendable step has been the publication, by Mr. A. R. Powys, of the series of articles on "The Repair of Ancient Buildings," which appeared in *The Builder*. These are fortunately to be published in book form early in the new year by Messrs. Dent and Son. Any Society would be fortunate that could command such support as that given by Mr. E. Jervoise, without payment, in connection with its efforts to compile a reliable schedule of ancient bridges; but, the Society for the Protection of Ancient Buildings is, in addition, the recipient of very generous donations that are a tribute to the value of work now being done. Opinions may differ regarding the action of the Society in the matter of the proposed new Sacristy at Westminster Abbey, but no committee of human beings, however highly qualified, can ever be infallible. No such committee ever has been. Regarded as a whole, the work of this Society will command universal admiration and support. In the reparation of our parish churches it has done much notable work, as Mr. C. R. Peers, the Chief Inspector of Ancient Monuments, stated in his stimulating address at the annual meeting of the Society. A reliable estimate of the value of its services can probably best be formed by picturing this country as it would be if William Morris and his friends had not taken the steps that led to the formation of the Society. In the annual report, detailed particulars will be found of the principal works which received the attention of the Committee during the year which ended on the 31st December 1927, together with statements of account and other information.

OLD COTTAGES AND FARM-HOUSES OF NORFOLK. *By C. J. W. Messent. Sm. fo. Norwich*, 1928. [*H. W. Hunt*].

This book represents an intensive study for one county of the rural architecture already treated in the admirable series published by Batsfords. The subject is treated in order of materials, but special chapters are devoted to farmbuildings, dovecotes and village shops. Much labour has been bestowed upon the compilation of the book, which is copiously illustrated by line sketches by the author. It is to be hoped that special studies will continue to be made of various parts of England so as in time to constitute a survey of the whole country, and thus stimulate a desire to keep what still remains of our rural beauties.

H. V. M. R.

Schools of Architecture

FOURTH SERIES

II.—Northern Polytechnic School of Architecture

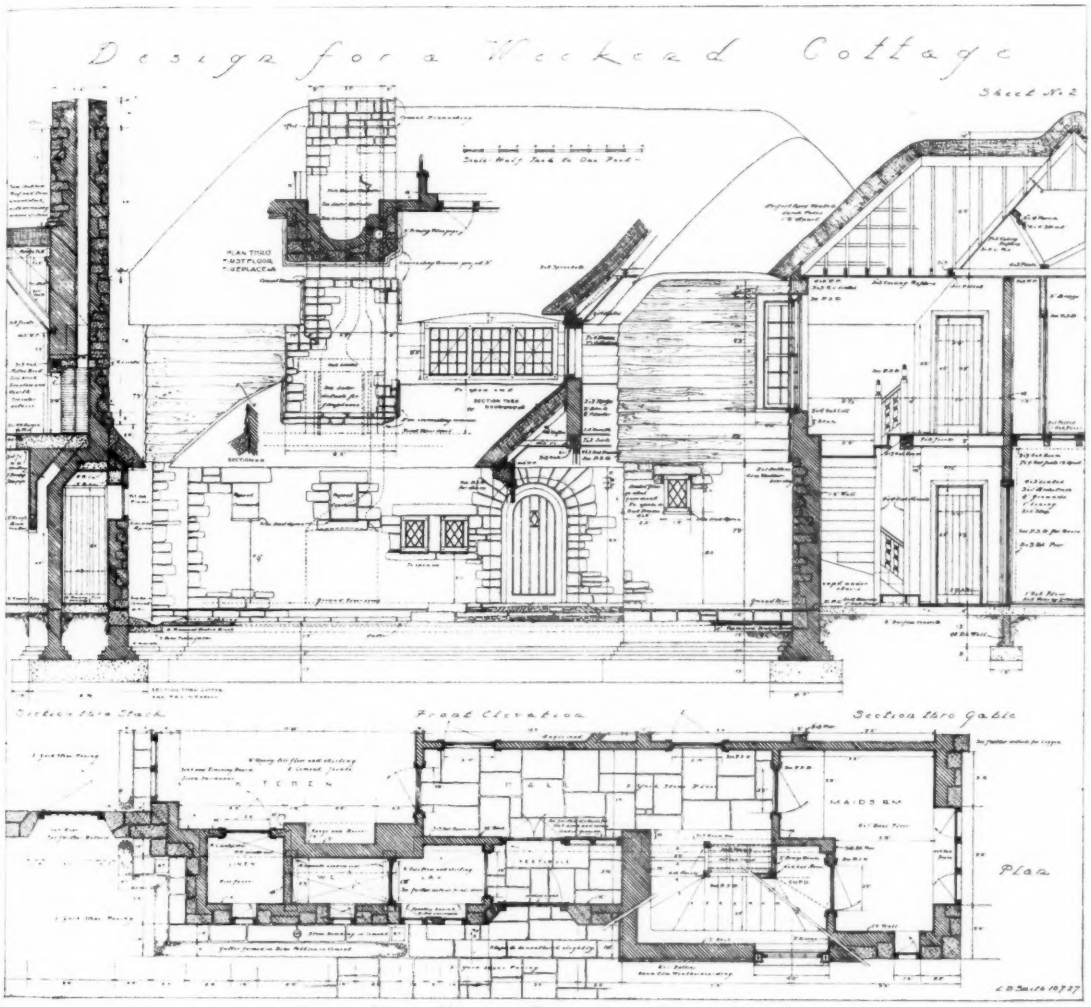
[THOMAS E. SCOTT [*A.*], HEAD OF THE DEPARTMENT]

Type of School and System of Government.—The Northern Polytechnic School of Architecture is part of the Department of Architecture, Surveying and Building, and is one of the most important sections of educational work in the group of schools known as the Northern Polytechnic.

FIRST YEAR: COMPOSITION OF ROMAN ELEMENTS

The Northern Polytechnic itself was brought into existence by a body of educationists as a result of the

Technical Education Act, and was opened in 1897. It was, and is, controlled by an independent governing body which has maintained the individuality of the School until the present time. It is supported by funds largely provided by the Board of Education and the London County Council and an endowment from the City Parochial supplemented by the public funds, and controlled by the Governing Body just referred to, which gives it the advantage of independent control and of public support. Through the L.C.C. it secures a certain amount of co-ordination with the general educational system of the County of London.



SECOND YEAR: WORKING DRAWING OF DESIGN SUBJECT

Charities. These funds are, however, administered by the Governors, who are elected as follows :—

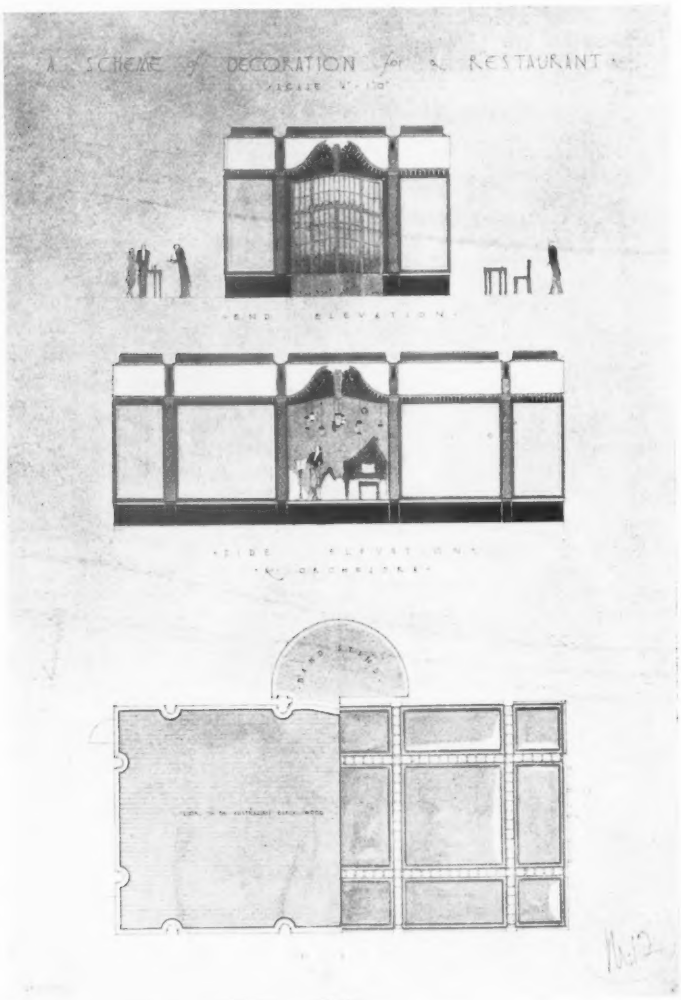
London County Council, 8.
Central Parochial Foundation, 3.
Co-opted, 5.

The School is supported by the fees paid by students,

Contact with Day Schools.—The architectural students are principally drawn from secondary or public schools, the parents in most cases being resident in London or Middlesex. A certain number of scholarships are awarded annually by the L.C.C. and the Middlesex County Council, and are available for competition

amongst day scholars of the respective county areas. Other scholarships are available for competition amongst scholars attending junior technical schools. The entrance examination and personal interviews control the acceptance into the School of suitable candidates.

Physics and Chemistry.—The Department of Architecture, Surveying and Building, as its name implies, possesses a School of Building and allied subjects. As a result, the student in the School of Architecture is able to receive thoroughly practical workshop training and to obtain first-



THIRD YEAR: INTERIOR DECORATION

Scholarships.—The existence of scholarships tends to raise the general standard of work among the students, while the ultimate necessity of earning their living ensures that the majority of those in the School display unmistakable keenness and industry.

School of Architecture, School of Building, Schools of hand knowledge of the manipulation of tools and of the possibilities of building materials. In addition he secures the benefit of tuition by experts in steel construction, reinforced concrete, quantity surveying, sanitation, building materials and building supervision.

Outside the department, but forming part of the

Northern Polytechnic, are Schools of Chemistry and Physics. The highly trained scientific staffs of these schools, part of whose duty consists of the tabulation and study of problems connected with the science of building, are available for the architectural student, who can learn from them the scientific and mechanical principles which underlie the use of building materials, strains in structures, mechanics of building, and also the elements of electricity, heating, ventilation, acoustics and other problems.

In practice it is found that this co-ordination of the practical side of building with the sciences of chemistry and physics is of very real advantage to the complete curriculum of the Architectural School.

Architectural Education.—The foregoing paragraphs would appear to stress to an undue extent the practical side of architecture. This is far from being the case. It is the principle of the School, as it must be of the profession, that design is the basis of the work of the architect, and that all other subjects are subsidiary to this important architectural function.

Design, therefore, occupies an extremely large part of the curriculum. A weekly esquisse is held throughout the year. More elaborate design subjects are taken and given positions of extreme importance through each term; moreover, studio drawing, colouring, rendering and draughtsmanship are regarded as items of unquestioned necessity in the scheme of architectural training.

Studio Drawing.—The syllabus of work in connection with studio drawing has been arranged to cover all types of draughtsmanship with which the architect may be called upon to deal, and covers cast drawings in pen, pencil and wash, rendered drawings, perspective, colour harmony and colour composition, and drawing from the antique. It is probable that a class in life drawing will be commenced within the next few weeks. Studio work also covers regular visits to the British and South Kensington Museums and the preparation of sketches and measured drawings.

Aims of the School.—The aim of the School has been to impress upon the architectural student the fact that architecture is in reality fine and imaginative building. He is encouraged to obtain a complete grasp of the practical requirements of building, together with a comprehensive knowledge of the magnificent forms of the great historical periods, so that he is, in the course of time, able to exercise imagination and originality in the production of work which will fulfil all the practical requirements of planning. The ideal scheme is shown to be one which satisfies the users of the building and at the same time clothes the bones of the structure with form and texture which are externally attractive to the eye and the intellect, and internally provide comfort, effect, attractiveness and suitability in the wide range of buildings which it falls to the lot of the architect to produce.

The great keynote of the School teaching is the combination of exact knowledge with imaginative qualities. It is believed that, by the acquisition of a comprehensive knowledge of materials and structure, the student will be able to carry out work with exactness and effect, to design details which will fulfil all the requirements of the particular part of the building they are intended to adorn, which respect tradition and possess the unmistakable imprint of new thought, of new dispositions, and of the business and legal aspects which are so essential to the production of successful buildings under modern conditions.

It is believed that the country requires architectural ability of the highest order, and that it is the business of the School to discover where native ability of this kind exists and to develop it until its owner is able to command the great field of knowledge which is covered by the extensive practice of the profession.

[Contributed by Mr. T. P. Bennett [*F.*], Head of the Department, 1920-28].

ST. PAUL'S BRIDGE.

The following resolution was passed at a meeting held on 14 January, convened by the R.I.B.A. and attended by representatives of the more important societies interested in the amenities of London :—

> This meeting is of opinion that the Bill now before Parliament for the extension of time for the building of St. Paul's Bridge ought not to be agreed to :—
>
> (*a*) Because any bridge with its approaches in the neighbourhood of St. Paul's must be a danger, either in its construction or its natural consequences, to the stability, amenities and artistic value of the Cathedral, and
>
> (*b*) Because the Royal Commission on Cross-River Traffic (as well as the Royal Fine Art Commission) has rejected a scheme for a St. Paul's Bridge.

MR. D. S. MACCOLL [*Hon. A.*].

Mr. D. S. MacColl, the critic and painter, has become Editor of *Artwork* on the retirement of Mr. Herbert Wauthier.

Mr. MacColl has served as a critic on the *Spectator*, *Manchester Guardian* and *Saturday Review*, and is the author of a volume on "Nineteenth Century Art." He was at one time editor of the *Architectural Review*, and is an Hon. Associate of the R.I.B.A. He was for some years the Keeper of the Tate Gallery and afterwards of the Wallace Collection, and a Trustee of the Tate Gallery. He took the lead in the foundation of the National Art-Collections Fund of the Contemporary Art Society, and of the modern Foreign Gallery at Millbank, and he is a member of the Royal Fine Art Commission.

MR. F. R. HIORNS.

Mr. Fredk. R. Hiorns [*F.*] has been elected a Fellow of the Society of Antiquaries.

AMERICAN SCHOLARSHIP FOR LIVERPOOL SCHOOL OF ARCHITECTURE.

The American Society of Arts and Sciences has founded three valuable travelling scholarships in architecture—one for an American student to study European architecture, one for a French student to study American architecture, and one for an English student to study American architecture.

This last scholarship has been given to the Liverpool School. It is of the value of £300 a year, and, as a seat is to be found in an American office for the holder for four months of the time he is in America, when he will receive a salary, the value is really greater. For the remaining two months he is to travel, and after his visit it is a condition that he writes a thesis on some recent development of American architecture. These theses will in time, it is thought, make a valuable historical record of the progress of architecture in America.

Allied Societies

(The attention of Members of Allied Societies is particularly called to this page.)

Notices

THE ROYAL ARCHITECTURAL INSTITUTE OF CANADA.

TWENTY-SECOND GENERAL ANNUAL MEETING

Montreal, 21 February 1929, and Toronto, 22 and 23 February 1929.

The twenty-second general annual meeting of the Royal Architectural Institute of Canada will be held at Montreal, Que., on Thursday, 21 February 1929, and will be adjourned to resume its business in Toronto, Ont., on Friday and Saturday, 22 and 23 February 1929.

The business of this meeting will be as follows :—

1. Meeting of the (1928) Council.
2. Sessions of the general annual meeting : (*a*) routine business, (*b*) reports, (*c*) miscellaneous matters.
3. Meeting of the (1929) Council for the election of officers and other matters.
4. Annual dinner.

ALCIDE CHAUSSÉ, *Honorary Secretary.*

THE SOUTH WALES INSTITUTE OF ARCHITECTS, CENTRAL (CARDIFF) BRANCH.

The annual Prize Distribution and Exhibition of Designs and Measured Drawings of the Welsh School of Architecture will be held at the Assembly Hall, Technical College, Cardiff, on Thursday, 31 January 1929, at 4.30 p.m. The chair will be taken by C. S. Thomas, Esq., F.R.I.B.A. (President of the South Wales Institute of Architects).

The prizes will be presented by the Right Hon. The Lord Mayor (Alderman W. R. Williams, J.P.). An address on the work of the School of Architecture will be given by W. S. Purchon, M.A., A.R.I.B.A. (Head of the Welsh School of Architecture, the Technical College, Cardiff). Tea will be provided, 4.30–5.30 p.m. Ladies will be especially welcomed.

R.S.V.P. not later than 28 January (stating if you will be accompanied by one or more friends) to : The Hon. Secretary, South Wales Institute of Architects, Central Branch, The Technical College, Cardiff.

SMOKING CONCERT, 31 JANUARY 1929.

A Smoking Concert will be held at the Dormie Cafe, Queen Street, Cardiff, on 31 January from 7.15 to 10.15 p.m. An excellent musical programme is being arranged and refreshments will be provided. Tickets, price 2s. 6d., may be obtained from Mr. G. L. Price, c/o Messrs. Ivor Jones and Percy Thomas, 6 and 7 St. John's Square, Cardiff; Miss K. Atkins, c/o T. Alwyn Lloyd, Esq., F.R.I.B.A., 6 Cathedral Road, Cardiff; Miss O. Price and Mr. C. J. Bartlett, The Welsh School of Architecture, or applications for tickets, enclosing remittance, may be sent to W. S. Purchon, Esq., Branch Hon. Secretary, not later than 28 January.

INSTITUTE OF ARBITRATORS.

Captain W. T. Creswell, B.A.I., will lecture on the "Conduct of an Arbitration" at 5 High Street, Cardiff, on Thursday, 7 February, at 5 p.m., under the auspices of the Institute of Arbitrators, and an invitation is extended by that Institute to the members of the South Wales Institute of Architects (Cardiff Branch) to attend.

W. S. PURCHON,
Branch Hon. Secretary.

HAMPSHIRE AND ISLE OF WIGHT ARCHITECTURAL ASSOCIATION.

The following list of meetings has been arranged by the Hampshire and Isle of Wight Architectural Association for 1929 :—

Friday, 18 *January*.—Council meeting, Winchester, 3 p.m.; General meeting, Winchester, 6.15 p.m.

Saturday, 2 *March*.—Excursion, Bournemouth Pavilion. Conducted by Messrs. G. W. Home and S. Knight, A.A.R.I.B.A.

Friday, 15 *March*.—Council meeting, Southampton, 3 p.m.; nominations for Council and Officers. Public lecture, Southampton, 6.30 p.m. Captain Edwin Gunn, A.R.I.B.A., "Architecture and the General Public."

Friday, 19 *April*.—General meeting, Winchester, 5.30 p.m.; nominations for Council and officers; Public lecture, Winchester, 6.30 p.m. Dr. Raymond Unwin, F.R.I.B.A., "Town Planning here and in America."

Saturday, 11 *May*.—Annual general meeting, Winchester, 10 a.m.; election of Council and officers. Visit of Berks, Bucks and Oxon. Architectural Association to Winchester.

Thursday, 6 *June, to Wednesday*, 12 *June*.—Exhibition of selected testimonies of study for R.I.B.A. Intermediate and Final Examinations, Portsmouth.

Wednesday, 12 *June, to Saturday*, 15 *June*.—British Architects' Conference, York.

Saturday, 22 *June*.—Excursion.

Wednesday, 3 *July, to Wednesday*, 10 *July*.—Annual Exhibition, Bournemouth.

Saturday, 17 *August*.—Excursion.

Friday, 18 *October*.—Council Meeting, Winchester, 3 p.m.; general meeting, Winchester, 6.15 p.m. (President's Address).

Thursday, 7 *November*.—Public lecture, Bournemouth, 6.30 p.m.

Friday, 6 *December*.—Council meeting, Winchester, 3 p.m.; General meeting, Winchester, 6.15 p.m.

A. L. ROBERTS, *Honorary Secretary.*

MANCHESTER SOCIETY OF ARCHITECTS

The Education Committee of the Manchester Society of Architects arranged for the following lectures to be given during the Winter Session :—

14 *November* 1928.—"The Depreciation in the Value of Property due to High Buildings," by John Swarbrick, Esq., F.R.I.B.A.

12 *December* 1928.—"Modern Work in France and Holland," by Lieut.-Colonel H. P. Cart de Lafontaine, O.B.E., A.R.I.B.A.

9 *January* 1929.—"The Origin of Gothic," by T. D. Barlow, Esq., M.A.

13 *February* 1929.—"Everyday Houses, English and Foreign," by Oswald Milne, Esq., F.R.I.B.A.

13 *March* 1929.—"Security: The Construction of a Modern Strong Room," by J. Hembrow, Esq., A.R.I.B.A.

NORTHAMPTONSHIRE, BEDFORDSHIRE AND HUNTINGDONSHIRE ASSOCIATION OF ARCHITECTS.

The annual meeting of the Northamptonshire, Bedfordshire and Huntingdonshire Association of Architects will be held at the Swan Hotel, Bedford, at 3.30 p.m., on Friday, 1 February.

THE SOUTH-EASTERN SOCIETY OF ARCHITECTS.

The Kent Education Committee and the South-Eastern Society of Architects arranged for two illustrated lectures on "Beautifying our Surroundings," by Mr. R. Goulburn Lovell [*A.*], to be given in the Town Hall, Maidstone, on 16 and 23 January. Mr. Lovell chose as his subjects, "The Design of Buildings" and "The Improvement of Town and Countryside." A list is printed below of other dates and towns where similar meetings will be held:—

Thursday, 10 *January* 1929.—Farnham.
Wednesday, 16 *January* 1929.—Maidstone.
Thursday, 17 *January* 1929.—Farnham.
Wednesday, 23 *January* 1929.—Maidstone.
Thursday, 24 *January* 1929.—Canterbury.
Friday, 25 *January* 1929.—Ashford.
Thursday, 31 *January* 1929.—Canterbury.
Friday, 1 *February* 1929.—Ashford.
Friday, 8 *February* 1929.—Margate.
Thursday, 14 *February* 1929.—Ramsgate.
Friday, 15 *February* 1929.—Margate.
Thursday, 21 *February* 1929.—Ramsgate.

WEST YORKSHIRE SOCIETY OF ARCHITECTS.

SESSIONAL MEETINGS, 1928–29.

Thursdays at 7 p.m., at the Society's Headquarters, except where otherwise stated.

31 January.—*Students' Evening—Debate:* "To be the compleat Architect is it necessary to engage in broader interests than those usually associated with the practice of architecture." (*A*) E. Seel. (*N*) J. Needham.

7 February.—*General Meeting—Lecture:* "Town Planning," by H. V. Lanchester, F.R.I.B.A., M.T.P.I. (Illustrated.)

Exhibitions of drawings and photographs of executed works by members are on view at each meeting.

NOTICE.

Members are asked to notify any change of title or address without delay in order that the necessary change may be made in the next year book.

A number of applications for employment are on the register. Practising members desiring assistance are requested to communicate with the Hon. Secretary.

JOSEPH ADDISON,
Hon. Secretary.

Reports

THE MANCHESTER SOCIETY OF ARCHITECTS.

On 14 November Mr. John Swarbrick read a paper before the Manchester Society of Architects on "The Depreciation in the Value of Property due to High Buildings," which was illustrated by a considerable number of modern easement of light projections, used by him in connection with cases in London, Manchester and other places. Mr. Harry S. Fairhurst, F.R.I.B.A., a Past-President of the Society, occupied the chair. Referring to the action of the Manchester Corporation in certain recent cases, the lecturer asked whether it was in the best interests of the community as a whole that municipal corporations should be left to determine which firm should be permitted to erect great structures and increase both their rental and site values, and at the same time correspondingly depreciate the rental and site values of adjoining sites. He explained by means of illustrations how loss of natural illumination from the sky affected the rental value of various kinds of city premises. "We," he said, "who have been accustomed in the past to four- and five-storey buildings know how even in them the natural light of the sky is often very largely cut out." The streets between such buildings might be comparatively light, although the sunshine might rarely enter them, owing to the fact that they were exposed to the bright diffused light from the zenith. But what was bound to be the condition of the offices from which the light was intercepted? They all knew from experience that those who worked in offices and factories in which a minimum amount of direct light from the sky was obtainable, suffered from a variety of forms of sickness and ill-health. They also knew that those who worked out of doors and received the invisible ultra-violet rays enjoyed, almost without exception, comparatively robust health, did their work with vigour and took a pleasure in it.

In the past, it had been exceedingly difficult to assess in a proper manner what would be a reasonable amount of compensation to pay to a firm whose easements of light had been detrimentally affected by a new building. The difficulty had arisen owing to the lack of means to define scientifically in an absolutely indisputable way the exact nature of the injury that had been done. Fortunately means had now been found whereby all uncertainty had been removed. There might still be differences regarding the extent to which a specific infringement of light would affect the rental value, but there need be no uncertainty regarding the precise nature of the infringement. At one time it was customary to measure lighting conditions by means of photometers, but that could obviously only be done when the conditions in question were in existence, as after a new building had been erected. There were, however, considerable technical difficulties in doing that accurately, owing to the rapid variations in intensity of illumination that might be taking place externally at the time. The only way in which photometers could be used satisfactorily in that manner was when two instruments, calibrated so as to give exactly the same reading under identical conditions, were used, both internally and externally, at exactly the same times. In that way, it was possible to obtain corresponding readings at the same moment, both within and without the buildings, and so to obtain reliable results. The most reliable method of measuring loss of illuminations was represented by a series of projections on paper which were usually known as Sky Projections, Calculating Sheets and Daylight Plans. The new methods were most helpful because they made it possible not only to show exactly how much light would be lost in any interior, owing to the erection of a proposed new building, that had not been commenced, but also to prove exactly the amount of light that was obstructed by some previous erection which had been demolished. That was most important.

In conclusion, Mr. Swarbrick stated that, owing to human nature and temperament, it was sometimes quite impossible to determine disputes of this kind by mutual agreement. In some cases, as they all knew, such cases drifted into Court, and not infrequently were referred to arbitration. In either case, in the normal course of things, a considerable amount of expense was

incurred by each party to the dispute. One of the most inexpensive ways in which he had known a dispute of this kind to be settled, was that adopted in a certain recent case in London, in which he had been retained. In that instance, an eminent architect was appointed sole arbitrator, and it was agreed that each party should be represented by only one witness and that neither solicitors nor counsel should be present at either the hearing or the inspection. In this way, he represented his clients, the owners of the dominant tenement, whilst a well-known light specialist was retained on behalf of the building owner, responsible for the erection of the servient tenement. The award in question was given in favour of his client, who was awarded compensation free from all costs. As the matters in dispute were almost entirely of a technical nature, it seemed to him that the course adopted was a sound one, and one that might be followed in many other cases in which legal issues were not controlling factors in the making of the award. He understood that an arbitrator, appointed under the Arbitration Act, could always apply to the High Court for a ruling on a legal issue, if he should consider that it was desirable to do so. In many cases, the main difficulty of the Arbitrator was to ascertain precisely what the facts were.

The lecture of Lieut.-Colonel H. P. Cart de Lafontaine, O.B.E., A.R.I.B.A., was given at a meeting of the Society on 12 December, at which Mr. Francis Jones, F.R.I.B.A., the President of the Manchester Society of Architects, presided. The lecture was illustrated by lantern slides. Colonel Cart de Lafontaine described much of the best work of the younger generation in both France and Holland, and explained the architectural tendencies common in both countries. He directed special attention to the simple composition and lines of severe classicism to be found in both cases. At the conclusion of his lecture he expressed the opinion that architects should realise the possibilities of reinforced concrete for all types of buildings, and derive what advantage they can from the examples set by the architects of both France and Holland, whilst at the same time taking care to avoid the errors and defects of their methods. He also suggested that architects might encourage good building by giving medals to workmen engaged on building contracts, and expressed his opinion that such a course would do much to increase the enthusiasm of the men and give them a much greater interest in their work.

The Annual Dinner.

The annual dinner of the Manchester Society of Architects was held at the Queen's Hotel, Manchester, on 7 December 1928. The guests of the Society included Mr. Walter Tapper, A.R.A., President of the Royal Institute of British Architects; Colonel Westcott, Lord Mayor of Manchester; Sir Giles Gilbert Scott, R.A., and Lady Scott; Sir Robert Lorimer, A.R.A.; Dr. Hewlett Johnson, Dean of Manchester; Mr. Ian MacAlister, Secretary of the Royal Institute of British Architects; His Honour Judge Leigh.

Mr. Francis Jones, F.R.I.B.A., the President of the Manchester Society of Architects, in proposing the toast of "The Royal Institute of British Architects and the Allied Societies," said that much of the value of a city depended on its exterior things, its buildings, its roads, yet very little did they hear of such amenities. Along the arterial road there might be seen a thin red line, or a black one, of cottages, shops and other buildings, all straggling out and spoiling these magnificent roads. Why did we allow this? People were paying large sums for these roads, and he could not see why we should not go to the additional expense of employing someone who would control in some slight degree the design of buildings on the roads, and he would suggest this to the Lord Mayor of Manchester as a worthy object. The architectural societies must do something about it. They should be able to help the Society for the Preservation of Rural England in such matters.

Mr. Walter Tapper, A.R.A., President of the Royal Institute of British Architects, in respondiing to the toast, described architecture as a moral, intellectual, and social force. For this reason, he had always pressed for the inclusion of the study of fine arts in a general education.

Sir Robert Lorimer, K.B.E., A.R.A., R.S.A., who also responded to the toast, said that he believed architects were becoming more practical than they used to be, and the line they took was that they must make their buildings as fit for their purpose as possible. If people would depend upon plan, and proportion, and light and shade, and cut out such "classic stuff" as the fat boy holding up the soup tureen, there would be money to spend on one or two pieces of real artistic detail, such as those he had seen in many parts of Sweden.

Mr. G. B. Howcroft, M.C., M.A., A.R.I.B.A., in proposing the toast of "The City of Manchester," complimented the city on a number of new buildings that had been built within the last few years of outstanding character.

The Rt. Hon. Colonel George Westcott, J.P., Lord Mayor of Manchester, in his response, invited the architects to help in the city's affairs. There were 140 members on the City Council, but, if among them there were not architects, their pressure could only be exerted from outside. It was seldom that he heard the small voice of the Society raised in the help of the city's affairs. If that help were missing it was the fault of the architects. The Society might have been of great value on several occasions, but he had never heard or received, for instance, a single suggestion for the development of Wythenshawe. If the city were to develop as the society desired, it was for the Society to rise in its strength and say what it thought. Manchester was now committed to the erection of a magnificent library in Peter Street and he was anxious to see the beginning of the Art Gallery in Piccadilly, but that could not be until the new library made room for the books from the old library.

The toast of "Our Guests" was proposed by Professor A. H. Worthington, M.A., A.R.I.B.A., and responded to by his Honour Judge Leigh, the Dean of Manchester, and Sir Giles Gilbert Scott, R.A.

WEST YORKSHIRE SOCIETY OF ARCHITECTS.

Précis of Special Meeting held 20 December 1928.

The proposals of the Council R.I.B.A. to re-open the Licentiateship Class of Membership on the same terms as the 1909 Charter, etc., was approved by the General Meeting.

Members who are also Members of the R.I.B.A., are asked to support the Society's verdict by recording their approval on the voting paper they will receive in due course.

Mr. G. H. Foggitt [*A.*], president, took the chair at a special general meeting held at Leeds on 10 January, to consider the control of building design, and to frame a reply to the Improvements Committee of the Leeds City Council, which had invited the society to submit proposals for the control of the design of buildings along arterial roads within its jurisdiction.

The council of the society had requested Mr. Robert H. Mattocks, M.T.P.I., to pass in review the methods and amount of control exercised elsewhere, as a means of eliciting discussion. Mr. Mattocks gave as the title of this paper: "To consider the Advisibility of Control of the Design of Buildings erected along Arterial Roads in our Cities."

After dealing with the scope of control already in action in this country, on the continent and in America, Mr. Mattocks went on to consider the various ways in which it is put into effect: In most places, where control exists, there is an art commission or a council of experts, but the power of veto is often vested in another body and not in the commission.

In each Swedish municipal borough and urban district the power of control is vested in a building board of 5 members, three being elected by the city council. Stockholm has also an advisory committee of nine, two of whom are members of the Council, the rest are approved after consultation with specialist bodies. In Prussia the act is administered by the building police in co-operation with the Municipal Authorities. In Berlin the building police pass all the less important buildings and the more important ones are submitted to a higher council of experts.

This higher council of experts consists of one member of the Academy of Art, one member of the Academy of Building Construction, the Reich Art Adviser, a technical official nominated by the Ministry of Social Welfare, the head of the Department of Art in the Ministry of Arts and Sciences, the Conservator of artistic monuments, the leading technical officials in the building police departments of the Chief President of the Province of Brandenberg, and of the Police President in Berlin, a member of the Bund Deutscher Architeken, a member of the Architektenverein, a representative of the Municipal building police, the City Engineer for underground and street construction, the City Planning and Building architect (both are members of the Municipal Council), and several members of the Municipal Council and of the District Councils. The City Planning and Building Architect presides over the Council.

In the whole of Germany " influence on the architecture of buildings is exercised everywhere by means of ' architectural control,' sometimes functioning through administrative bodies provided for in the budget, but in many cases function is exercised by the town planning office or the building office.

" In important cases in which the architectural control requires support or needs restraint, an advisory council of experts is called together.

" Originally when the German towns were entirely under the state building police administration and the notion prevailed that insistence on æsthetic requirements was not a function of the police, the town set up an architectural control department completely independent of the building police. The municipal authorities in these circumstances could not exercise the powers of the building police so as to enforce their views on builders. They could only use the influence of such powers as the municipality itself could bestow upon them. These powers were, exemption from the prohibition of buildings on streets not yet laid out, and exemption from the provision of building bye-laws, which the state building police could not give without the approval of the municipality." By stretching these two powers to their limit, control over almost all building has been obtained.

" The most determined opponents of architectural control everywhere are those architects and contractors who have little or no artistic training. On the other hand, competent and qualified architects welcome and support architectural control because their own efforts to combat disfigurement by bad neighbouring buildings are upheld, and because the architectural control official invariably recommends building contractors to avail themselves of the service of competent architects.

" The committee of experts, generally speaking, have not fulfilled the expectations of those who recommend them, the tendency being to make them too large."

In the United States the most interesting experiment is that being made in Washington. All new designs for public buildings being already controlled by the National Commission, the new body seeks to complete the network of control by taking action in respect to all designs for private buildings. Its object is to influence such design at the time of inception, if possible, or alternatively, before it has been sanctioned by the Local Authority, and to supplement this action by publishing carefully phrased reviews of new buildings for the enlightenment and guidance of the man in the street. These criticisms are intended to be constructive and are regularly transmitted each week to the owner or architect concerned. There is nothing compulsory about this advice ; many owners and architects have co-operated and benefited by it, the result as a whole being a substantial balance to the good.

Most of the ablest architects of Washington are members of this novel council and they are all liable to service on an arbitrary assignment. The service is voluntary. New blood and a broad outlook are secured by bringing the whole fifty-two architect members of the Council into service by means of a constantly changing jury system, whereby an executive of three of the fifty-two members meet each week to adjudicate ; each week one new member is added and one dropped in accordance with a schedule of assignments for the year, this schedule being arranged and sponsored by a co-ordinate committee of the Washington Chapter of the Institute of Architects.

This experiment has the merit of being a broadly conceived honorary service operated by the profession itself and the local authority apparently grants permission to utilise the submissions already legally made in compliance with the local bye-laws. There is no legal power of veto, however, and results must be obtained by persuasion, assisted in obstinate cases by the coercive power of public opinion.

In this country the Bath Act is the best known example of control. It gave the corporation power to appoint a standing advisory committee for the city of whom one is to be an F.R.I.B.A. and one a F.S.I., nominated in each case by the president of the institute concerned, and the third a J.P., to be nominated by the Council but not himself a member of the Council, and it was made the business of this advisory committee when called in to act for the corporation in approving or disapproving " any matter referred to them " by the Corporation. The following description of its working has been given by someone in Bath.

" You will find, I think, that the Bath Clause operates in the following way : An architect or builder deposits plans with the Surveying Committee of the Bath Corporation for approval under the bye-laws, and now presumably under the Amenities Clause. The Surveying Committee consider those plans, and have power to reject if in their view the elevations or materials which it is proposed to be used are unsuitable, and if they do reject, notice is then given to the architect or builder depositing, and they then have the opportunity of appealing against the decision of the Committee and asking that their case might be considered by the Advisory Tribunal. If they do appeal and it goes to the Advisory Tribunal, the decision of that body has to be accepted by the depositors of the plans and by the Corporation. This Advisory Tribunal has been appointed for twelve months, but up to the present it has not even met.

" In my view there are two great weaknesses in the Bath Clause—firstly, that the Tribunal can only function on appeal, instead of all plans deposited being submitted to the tribunal for its opinion before going to the Surveying Committee ; secondly, that it does not apply, as far as I can read in the Clause, to anything which the Corporation themselves might desire to do. This would be a great danger in some places where the department concerned with the erection of public buildings is insufficiently staffed. I consider that any undertakings projected by the Corporation should be subject to the same supervision by the Advisory Tribunal as those submitted by private individuals, as I cannot conceive a committee sitting upon its own proposals rejecting them so as to give the Tribunal a chance of considering them.

" I believe the Bath Clause, amended and strengthened in the two directions I have named, would be a very great power

for good in the district, but without supervision, I am afraid—as is evidenced by no case having come before the Advisory Tribunal in over twelve months—it is of little use."

The Ministry of Health have prepared a model Clause on the lines of the Bath Act, but state that the Minister is only, "prepared to include similar powers in town planning schemes where he is satisfied that the responsible authorities can exercise the powers, and are in a position to establish the necessary machinery for reviewing the plans. The extent to which it may be found possible to give these powers must clearly depend upon the use that is actually made of them and the continuance of public opinion in their favour, and the inclusion of powers of the kind in particular schemes will be regarded as experimental and their working carefully watched.

"It would be a mistake, however, to place undue reliance on the power of regulation and control. At the best, it can do little more than prevent obvious defacement, and the attainment of sound standards of building design and appearance must depend in the main on the general growth of æsthetic taste and feeling, and the spread of influence by the force of education, example and persuasion."

Those of you who have read the Rural England number of the *Architects' Journal* will have noticed how varied are the answers to the questionnaires on control. Control confined to such things as colour of roof coverings and walls, kind of roof material, scale with reference to adjacent buildings could be imposed with a fair degree of unanimity, but the division of opinion on actual control of design is very marked. It is felt that control by laymen would not be good enough and that control by a committee with only one architect on it would place that architect in an undesirable relationship to the other members of the profession, and it might also, if he was still in practice, be the means of bringing him more work. Were there sufficient architects of good standing, the rota system used in Washington might get over these objections. Control in some districts would be a big task if all buildings' plans used had to be reviewed. In Leeds, for instance, about 70 plans are passed each month; to review so many designs would take more time than any one architect could spare unless paid for his work. Many of the contributors to the discussion are averse to the Advisory Committee's recommendations being backed by power to enforce. In this respect it is interesting to note this quotation from the International Town Planning Bulletin.

"It is to be remarked that Munich and Stuttgart, two towns that have accomplished great things and produced excellent results in preserving their old buildings and their 'town pictures' have not the most powerful legal means at their disposal nor the organisations to compel enforcement such as exist in some towns that get much less satisfactory results. In Munich and Stuttgart, in fact, architectural control is not a principle even in the hands of an official body; it works unobtrusively and does not appear at all in the municipal organisations, but the results of its labours are everywhere obvious. Even in architecture good traditions and customs are better than strong laws."

There is something to be said in relation to control on arterial roads even when control is not exercised elsewhere. These roads are the main lines of entry into the towns and should create a good impression, also control might help to stop the worst type of ribbon development, as those who dislike being dictated to would probably build elsewhere.

A discussion followed in which Messrs. Joseph Addison [*A.*], Victor Bain [*F.*], E. O. Robinson [*A.*], D. S. Andrews, B. R. Gribbon [*A.*], and J. E. Stocks took part. As a result of the opinions and suggestions advanced, a reply was framed requesting the Improvements Committee of the Corporation to adopt a panel from which a changing quota could be drawn, composed of one representative of the Improvements Committee; two from the architectural profession; two from the artistic professions, other than that of architecture; and one from the University of Leeds, to assist in the decisions of the committee as to the designs of the buildings in question.

Obituary

ARTHUR DIXON [*F.*]

Mr. Arthur Stansfeld Dixon died suddenly on Tuesday, 8 January, at the age of 72. Mr. Dixon was the eldest son of the late George Dixon, M.P., and was born at Edgbaston in 1856. He was educated at Rugby and at University College, Oxford, where he took the degree of M.A. He entered the architectural profession, and although he did a good deal of general work it was in the ecclesiastical branch of the art that he specialised. He designed St. Andrew's Church, Barnt Green; St. Basil's Church, Birmingham; the Chapel at Bishopscroft, Harborne; the Parish Church, Rowley Regis; and the Chapel of the Grey Ladies' College at Coventry. He also designed the Cathedral of the English Church Mission at Seoul, Korea, visiting that country in connection with the commission. He was a Fellow of the Royal Institute of British Architects, and was actively associated with the Birmingham Architectural Association, of which society he was a past president. He was also a partner in the firm of Rabone Bros. and Co.

VICTOR HODGSON [*L.*]

It is with great regret that we announce the death of Mr. Victor Hodgson, at Cuilcheanna, Onich, Inverness-shire, on 3 January 1929. Born at Welcombe, Harpenden, Herts, in 1875, Mr. Hodgson was the son of Mr. Henry Tylston Hodgson, a railway director and for some years deputy-chairman of the Midland Railway. He was educated at Harrow, and adopted the profession of an architect. Mr. Hodgson was F.S.A., F.S.A. (Scotland).

Mr. Hodgson devoted many years to a careful and detailed study of the history and archæology of the Western Highlands of Scotland. He was the founder of the West Highland Museum, Fort William, and secretary since its foundation five years ago. The West Highland Museum is a rare example of a regional museum. It began with collections from croft houses of furniture and articles illustrating past life in the Highlands. Subsequently many valuable relics were acquired.

Among other work Mr. Hodgson built a house at Ardnamurchan, which is of interest as being a copy of an old Highland croft house built of local stone, blue granite with heather thatching.

CARPENTERS' HALL LECTURES, 1929

The Worshipful Company of Carpenters have arranged a series of lectures to be held during February on the following dates at 8 p.m.:—

7 February: The Rt. Rev. H. Hensley Henson, D.D., Lord Bishop of Durham, on "Durham Castle," the Most Hon. the Marquess of Londonderry, K.G., in the chair.

14 February: Sir Frank Baines, K.C.V.O., C.B.E., F.R.I.B.A., on "Ancient Castles and Abbeys," Colonel and Alderman Sir Charles C. Wakefield, Bart., C.B.E., in the chair.

21 February: Raymond Unwin, Esq., F.R.I.B.A., on "The Housing Problem and How it has been Met," Sir Richard Paget, Bart., in the chair.

28 February: E. Guy Dawber, Esq., A.R.A., P.P.R.I.B.A., on "The English Countryside and Cottages—Old and New," the Rt. Hon. Earl Ferrers, F.S.A., F.R.I.B.A., in the chair.

The lectures will be illustrated by lantern photographs.

THE USE OF AMYL ACETATE IN PAINT SPRAYING SOLUTIONS.

The Science Standing Committee have had under consideration the question of the use of amyl acetate as a solvent for paint sprays, as information had reached them from several sources that the use of such a solution affected the health of the operator.

The Home Office have already formulated certain stringent requirements respecting the use of such a solvent in enclosed spaces, where its use is continuous, as, for example, in painting by spraying of motor car bodies, but the question which more closely concerned the Science Standing Committee was the use of such a spraying solution for painting the interior of buildings, which use naturally would only be occasioned in specific buildings.

To enable the Committee to come to a decision on the matter they heard in evidence a deputation from the London Association of Master Decorators, from whom they subsequently received a considered memorandum, copy of which is printed below.

In view of this considered opinion the Science Committee suggest that paint solutions of which the solvent is amyl acetate should not be used for interior decorative work except under very special conditions.

LONDON ASSOCIATION OF MASTER DECORATORS.

Avenue Chambers,
Vernon Place,
Southampton Row,
*W.C.*1.
4 *July* 1928.

AMYL ACETATE IN SPRAYING SOLUTIONS.

DEAR SIR,—Following upon my letter of 2 May and in response to the request made by the Chairman of your Science Standing Committee at the Meeting of that Committee held on 14 June, attended by a delegation from this Association relative to the use of amyl acetate, I am instructed to submit the following report :—

It must be understood that the opinion of this Association in this matter has been formed after a full consideration of the character of the work in which its members are mainly concerned, the decoration of normal residential and business premises in London : for whilst deprecating the application of paints by spray (in which form amyl acetate is principally applied) the Association does not pretend to disguise the fact that spraying, and the use of cellulose enamels containing amyl acetate or similar solvents, have come to stay, and that when used under suitable conditions, probably possess certain advantages.

This Association bases its opinion against the use of spraying generally, and of materials containing amyl acetate in particular, on two main grounds :—

1. The health of the operator.

2. The difficulty of complying with restrictive Home Office regulations. (Factory and Workshop Act 1901, s. 1 (1) (*d*) and s. 74)

In regard to the health of the operator, the Association has no evidence that amyl acetate is scheduled as a poison, but there is ample evidence from various sources, including the personal experience of some members of the Association, that the use of this diluent or solvent does produce upon the workmen engaged in its application a sense of intoxication accompanied by irritation of the nose and throat, causing a choking feeling. There is evidence that in some cases workmen are more or less tolerant to these effects, but in considering the majority this Association is of opinion that such unpleasant effects are bound to cause, in time, serious consequences to the health of the operator.

The question was asked by your Chairman as to whether or not there was a substitute for amyl acetate, and it has since been learned that this particular solvent is not found so suitable in a general way as other solvents, and that recently butyl acetate has found greater favour, and is apparently less disagreeable in use : this information tends to strengthen the opinion of this Association that the use of amyl acetate is to be discouraged.

In regard to the second point, this Association is satisfied that in most cases it is impracticable to secure, by temporary measures, the efficient ventilation which is required by the Home Office in circumstances where dust, fumes, etc., are produced, as is particularly the case when spraying is the method employed for the application of paints. It is claimed that the expert operator, with a spraying machine, by perfect adjustment of the machine and the material to be used, can apply the material without producing any appreciable vapour, but here again this Association has to consider not the exceptional but the general case.

Particularly in cases where amyl acetate or similar solvents are used, the general consensus of opinion of all concerned, apart from regulations, is that efficient ventilation is desirable ; and it is easy to visualise the exceptional difficulties that must obtain in ordinary premises for ensuring artificial ventilation, except at considerable cost and inconvenience.—Yours faithfully,

(Signed) STANLEY W. WALL,
Secretary.

Notices

THE SEVENTH GENERAL MEETING.

The Seventh General Meeting (Business) of the Session 1928-29 will be held on Monday, 4 February 1929, at 8 p.m., for the following purposes :—To read the Minutes of the General Meeting (Ordinary), held on Monday, 21 January 1929 ; formally to admit members attending for the first time since their election.

To proceed with the election of the Candidates whose names were published in the JOURNAL for 12 January 1929 [pp. 217–218].

To announce the Council's nomination for the Royal Gold Medal, 1929.

INFORMAL DISCUSSION OF MATTERS OF PROFESSIONAL INTEREST.

At the conclusion of the above business meeting there will be an informal and private discussion of matters of current professional interest or concern. Members are invited to bring up for discussion, with or without notice, subjects of professional interest or difficulty.

ELECTION OF MEMBERS.

Associates who are eligible and desirous of transferring to the Fellowship class are reminded that if they wish to take advantage of the election to take place on 10 June 1929, they should send the necessary nomination forms to the Secretary R.I.B.A. not later than Saturday, 13 April 1929.

LICENTIATES AND THE FELLOWSHIP.

The attention of Licentiates is called to the provisions of Section IV, Clause 4 (*b*) and (*c* ii), of the Supplemental Charter of 1925. Licentiates who are eligible and desirous of transferring to the Fellowship can obtain full particulars on application to the Secretary R.I.B.A., stating the clause under which they propose to apply for nomination.

PROPOSED TOUR TO THE UNITED STATES AND CANADA.

It will be remembered that an announcement was made in the JOURNAL some little time ago regarding a proposed visit to America, and the Secretary has pleasure in announcing that arrangements have now been completed for a party of members of the Institute and Allied Societies to make a short trip to the United States and Canada in July next.

The party will sail from Liverpool for New York by the Cunard liner *Laconia* on 13 July, and will return from Quebec by the *Ascania* on 3 August, arriving in Plymouth 10 August, and London on 11 August. The places visited on the other side will include :—

New York—Washington—Detroit—Niagara Falls—Toronto—Montreal—Quebec,

the trip from Toronto to Montreal being made by steamer down the River St. Lawrence, passing the Thousand Islands *en route*.

The cost of the trip will be approximately £95, this figure including cabin class accommodation on the above-mentioned steamers, rail fares in the U.S.A. and Canada, hotel accommodation (exclusive of meals ashore), sight-seeing trips, etc., and it is believed the trip will prove most attractive.

The Secretary R.I.B.A. will be glad to hear from those members who are interested and to forward a detailed itinerary of the tour on request.

Relatives and friends of members will be welcomed.

R.I.B.A. DEBATES BETWEEN ARCHITECTS AND SPECIALISTS.

The following is the programme for the remaining debates :—

Tuesday, 19 *February* 1929, *at* 5.30 *p.m.*—

Subject : " Plumbing : Reasonable Modern Practice and the Improvement of Bye-laws to Permit of it."

Speakers : Mr. W. H. M. Smeaton (Worshipful Company of Plumbers). Mr. T. P. Bennett, F.R.I.B.A

Tuesday, 19 *March* 1929, *at* 5.30 *p.m.*—

Subject : " Metal Fittings of Buildings in Modern Practice."

Speakers : Mr. W. G. Pringle, of Messrs. Bague's, Ltd. Mr. Robert Atkinson, F.R.I.B.A.

Tuesday, 23 *April* 1929, *at* 5.30 *p.m.*—

Subject : " Organisation."

Speakers : Mr. Matthew Hill (Messrs. Higgs and Hill). Mr. Maurice E. Webb, D.S.O., M.C., F.R.I.B.A.

It is hoped that as many as possible will attend the debates and that the discussions will be general and useful.

ALFRED C. CONRADE EXHIBITION.

An exhibition of the works (paintings and drawings) of Alfred C. Conrade will be held in the galleries of the Royal Institute of British Architects, 9 Conduit Street, February 5-16, inclusive.

R.I.B.A. STATUTORY EXAMINATIONS.

The R.I.B.A. Statutory Examinations for the office of District Surveyor under the London Building Acts, or Building Surveyor under Local Authorities, will be held at the R.I.B.A., London, on 1, 2 and 3 May 1929.

The closing date for receiving applications for admission to the examinations, accompanied by the fee of £3 3s., is 10 April 1929.

Full particulars of the examinations and application forms can be obtained from the Secretary R.I.B.A.

ACCOMMODATION FOR STUDENTS OF ARCHITECTURE.

The widow of a well-known artist resident in St. John's Wood has two or three vacancies for young students of art and architecture as paying guests.

A comfortable home is offered in a congenial atmosphere, suitable for young people possessing common interests.

Further particulars can be obtained from the Secretary R.I.B.A.

APPLICATIONS FOR MEMBERSHIP : ELECTION 18 MARCH 1929.

THE following applications for election have been received. Notice of any objection or other communication respecting the candidates must be sent to the Secretary for submission to the Council prior to Monday, 18 February 1929.

AS FELLOWS [9].

BRADSHAW : HAROLD CHALTON [*A.* 1918], 7 Vigo Street, W.1 ; 35 The Avenue, Kew Gardens.

IRWIN : LEIGHTON FRANCIS [*A.* 1920], Temple Court, 422 Collins Street, Melbourne, Australia ; 3 Holmwood Avenue, Brighton, Australia.

MYER : Lieut.-Colonel GEORGE VAL [*A.* 1905], Abbey House, Victoria Street, S.W.1 ; 22 Montpelier Place, Knightsbridge, S.W.

STEELE : HAROLD ROOKSBY [*A.* 1925], 14 Grays Inn Square, W.C.1 ; 87, Victoria Street, Westminster, S.W.1.

STEVENSON : ROY KENNETH [*A.* 1920], Temple Court, Collins Street, Melbourne, Australia ; 68 Coppin Street, Malvern East, Victoria, Australia.

TROUP : Major ROBERT JAMIESON, M.A., Croix de Guerre [*A.* 1922], 14 Grays Inn Square, W.C.1 ; 2 The Old Drive, Welwyn Garden City, Herts.

And the following Licentiates who have passed the qualifying Examination :—

MITCHELL : CECIL THOMAS, Public Works Department, Kampala, Uganda ; P.O. Box 78, Kampala, Uganda.

WILSON : FREDERICK CANDELENT, Architect, South Indian Railway Co., Ltd., Trichinopoly, South India ; Kimber Gardens, Trichinopoly, South India.

And the following Licentiate who is qualified under Section IV, Clause 4, cii, of the Supplemental Charter of 1925 :—

TAYLOR : THOMAS, 29 Queen Street, Oldham ; "Westdene," Middleton, near Manchester.

AS ASSOCIATES [40].

ALEXANDER : ANDREW GORDON [Final], 14 Devonshire Terrace, Lancaster Gate, W.2.

ASPLAND : ARTHUR [Passed five years' course at Liverpool University School of Architecture. Exempted from Final Examination after passing examination in Professional Practice], Brackenrigg, Windermere.

AYERST : CHARLES THOMAS [Final], 23 Oakley Square, N.W.1.

BANKS : PERCY HAROLD, P.A.S.I. [Special], 25 Burlington Street, Brighton.

BEALE : EDWARD HAYLEY [Passed five years course at the Architectural Association. Exempted from Final Examination after passing Examination in Professional Practice], Rockhurst, Burwash, Sussex.

BEGG : KENNETH ANDREW [Passed five years' course at the Edinburgh College of Art. Exempted from Final Examination after passing Examination in Professional Practice], 94 Inverleith Place, Edinburgh.

BERTRAM : STEPHEN NOEL [Passed five years' course at the Architectural Association. Exempted from Final Examination after passing Examination in Professional Practice], 27, Exeter Road, Brondesbury, N.W.2.

BROWN : JOHN SHERWOOD [Special], 54 Cromwell Road, Stanmore, Winchester.

BROWN : ROBERT NEVILLE [Final], Sylverton North, Westoe Village, South Shields.

BUTLING : GEORGE ALBERT [Passed five years' course at Liverpool University School of Architecture. Exempted from Final Examination after passing Examination in Professional Practice], 13 Old Quebec Street, Marble Arch, W.1.

CADMAN : HARRY GEORGE [Final], 4 Chart Road, Folkestone.

CARR : FRANK HENRY [Final], 25 Byfeld Gardens, Barnes, S.W.13.

CARR : TERENCE [Final], 19, Church Street, South Lambeth, S.W.8.

CARTWRIGHT : THOMAS NELSON [Final], Prudential Buildings, Nottingham.

COBB : ANDREW RANDALL [Special Exemption], Halifax, Nova Scotia, Canada.

COCHRANE : JOSEPH BRIAN [Passed five years' course at the School of Architecture, University of London. Exempted from Final Examination after passing Examination in Professional Practice], Chestnut House, Albrighton, near Wolverhampton.

COLEMAN : JOHN JAMES [Final], 68 Herrington Street, Sunderland.

DANIEL : TREVOR MERVYN [Final], Sunny Bank, Abersychan, Mon.

EDWARDS : ARTHUR STANLEY [Special], 115 Colmore Row, Birmingham.

HALL : DOUGLAS [Passed five years' course at Liverpool University School of Architecture. Exempted from Final Examination after passing Examination in Professional Practice], The White Cottage, Bangor, North Wales.

HAMILTON : ARCHIBALD OLIPHANT [Passed five years' course at the Glasgow School of Architecture. Exempted from Final Examination after passing Examination in Professional Practice], 71 Langside Road, Newlands, Glasgow.

HARRISON : GEOFFREY STANLEY [Passed five years' course at the Architectural Association. Exempted from the Final Examination after passing Examination in Professional Practice], Thurlow, Aldenham Avenue, Radlett, Herts.

HOWES : JAMES FREDERICK [Final], Port Vale House, Hertford, Herts.

JOHNS : BERNARD WINTON [Final], c/o No. 1 Parton Street, Red Lion Square, W.C.1.

KIDD : HENRY DOUGLAS [Special], 1, New Court, Lincoln's Inn, W.C.2.

LAW : OLIVER WILLIAM MAFEKING [Final], "Walton," Warham Road, South Croydon.

LE HUNTE : LEONARD [Final], 27 St. Agnes Place, Kennington, S.E.11.

MACGILLIVRAY : IAN DONALD [Passed five years' course at Liverpool University School of Architecture. Exempted from Final Examination after passing Examination in Professional Practice], P.O. Box 353, Bulawayo, South Rhodesia.

MANDERSON : FREDERICK KEITH, B. Arch. [Final], 26 Tavistock Square, W.C.1.

MORANT : CLIVE AUBREY LUSHINGTON [Special], 42 St. Johns Park, N.19.

STEELE : ALEXANDER [Passed five years' course at the Edinburgh College of Art. Exempted from Final Examination after passing Examination in Professional Practice], "The Quarry," Bo'ness, West Lothian.

SUMNER : BEVIS ALEXANDER [Passed five years' course at Liverpool University School of Architecture. Exempted from Final Examination after passing Examination in Professional Practice], "The Croft," Park Road, Heswall, Cheshire.

THEWLIS : EDWARD CHARLES [Final], 9 Westcliff Parade, Southend-on-Sea.

TOMKYNS : HAROLD GLENCOE [Special], P.O. Box 4959, Johannesburg, South Africa.

USHER : WILFRED [Final], 186 Front Street, Chester-le-Street, Co. Durham.

VINE : CYRIL MALCOLM [Final], 12 Tudor Chambers, Station Road, Wood Green, N.22.

WALTON : DONALD GARBUTT [Final], 19 St. Margarets Road, Plumstead, S.E.18.

WATSON : WALTER [Final], 40 Bayswater Road, Perry Bar, Birmingham.

WATT : JOHN [Final] 282 Batley Road, Alverthorpe, Wakefield.

WHYTE : WILLIAM GEORGE [Passed five years' course at Robert Gordon's Colleges, Aberdeen. Exempted from Final Examination after passing Examination in Professional Practice], c/o J. C. Cook, Esq., National Mutual Buildings, Johannesburg, South Africa.

AS HON. ASSOCIATE [1].

WOODWARD : ARTHUR MAURICE, M.A., F.S.A., Director of the British School of Archæology at Athens. The British School, Athens, Greece.

AS HON. CORRESPONDING MEMBER [1].

HORTA : VICTOR PIERRE, Architecte, Professeur honoraire à l'Université Libre de Bruxelles, Directeur et Professeur à l'Académie Royale des Beaux-Arts de Bruxelles, ancien titulaire du Cours d'Architecture à l'Institut Superieur des Beaux-Arts à Anvers. Membre de l'Académie Royale de Belgique, Membre de la Commission Royale des Monuments, etc., etc., 136 Avenue Louise, Bruxelles.

REFORM IN THE CONSTITUTION OF THE R.I.B.A.

The extent to which the reform in the constitution of the R.I.B.A. has brought about the real and effective representation of the architects of the country generally on the Council of the R.I.B.A. was strikingly illustrated at a recent meeting. It was an ordinary meeting of the Council and the attendance was normal, but a glance round the table showed that the following centres were represented in some cases by more than one member:—London, Bristol, Oxfordshire, Birmingham Sunderland, Liverpool, Sussex, Leicester, Swansea, Norwich, Leeds, Northampton, Sheffield, Manchester, Carlisle, Aberdeen, Plymouth, Basingstoke, York, Nottingham, Dundee.

Competitions

BOROUGH OF CHESTERFIELD. COMPETITION FOR NEW INFANT AND JUNIOR SCHOOL.

Members of the Royal Institute of British Architects and of its Allied Societies must not take part in the above competition because the conditions are not in accordance with the published Regulations of the Royal Institute for Architectural Competitions.

ALMSHOUSES COMPETITION: SOUTH MOLTON.

The Competitions Committee desire to call the attention of members to the fact that the conditions of the above competition are not in accordance with the regulations of the R.I.B.A. The Competitions Committee are in negotiation with the promoters in the hope of securing an amendment. In the meantime members should not take part in the competition.

COMPETITION FOR THE COLUMBUS MEMORIAL LIGHTHOUSE.

A copy of the report containing complete details of the conditions governing the above competition has been received in the R.I.B.A. Library. Members who desire to enter the competition are required to fill up a registration form and return it to the Pan American Union, Washington. A number of forms are being sent to the R.I.B.A., and can be obtained from the Secretary as soon as they are received. Preliminary details of the competition were published in the R.I.B.A. JOURNAL, 14 July 1928.

R.I.B.A. COMPETITION FOR A DESIGN FOR A GARAGE IN THE THEATRE AREA OF LONDON.

The conditions for the R.I.B.A. Competition for the Design of a Garage in the theatre area of London, the prize money for which has been presented by Mr. H. S. Horne, of 74, Park Street, London, W.1, have now been issued and copies may be obtained free by intending competitors on application to the office of the R.I.B.A., 9, Conduit Street, London, W.1.

The competition is open to architects and students of architecture of British nationality.

The first prize is a sum of £350, and in addition £140 will be divided at the discretion of the assessors between competitors whose designs are considered especially meritorious.

The attention of the Assessors has been called to references in the press to the R.I.B.A. Competition for a Design for a Garage in the Theatre area of London.

The Assessors wish to point out:—

(1) That the whole competition is hypothetical.

(2) That there is no intention on the part of the R.I.B.A. to convey the impression that the building will be executed.

(3) That the designs and drawings will remain the property of the competitors.

The site is purposely left indefinite so as to give full scope for new ideas on this interesting subject.

SIMON BOLIVAR MEMORIAL.

PRELIMINARY DETAILS OF A COMPETITION FOR THE ERECTION OF A MONUMENT TO THE LIBERATOR BOLIVAR IN THE CITY OF QUITO.

A competition has been opened for the erection in Quito of a monument to Bolivar.

The Ecuadorean Minister in Paris and two members of the Sociedad Bolivariana of Quito, residing in Paris, will form a Committee to organise and carry out the said competition.

A jury of four members, composed of experts, artists and art critics will judge the works presented.

The designs, "Esbozos" (drawings or sketches), "maquettes," etc., which it is desired to present must be forwarded to the Legation of Ecuador, 91 Avenue Wagram, Paris, not later than 31 March 1929.

The sum of 2,000,000 French francs is available for the purpose of erecting the monument. This sum includes the fees of the artist who will carry out the work, either by himself or with others acting under his direction.

Honourable mention will be awarded to the authors of the designs adjudged second and third.

The decision of the Jury will be submitted to the Sociedad Bolivariana, of Quito, for ratification, prior to the contract with the author of the selected design being signed.

PROPOSED MUNICIPAL BUILDINGS AND MARKET HALL, ELLESMERE PORT.

The Urban District Council of Ellesmere Port and Whitby invite architects to submit designs in competition for the Municipal Buildings and Market Hall proposed to be erected on a site in Whitby Road, Ellesmere Port.

Assessor: Mr. T. R. Milburn [*F.*].

Premiums: £100, £75 and £50.

Last day for sending in designs, 15 February 1929.

Last day for questions, 8 November 1928.

Conditions of the above competition may be obtained from the Clerk to the Council, Council Offices, Ellesmere Port, by depositing £1 1s.

R.I.B.A. COMPETITION FOR A DESIGN FOR AN AERODROME.

The designs submitted by the competitors in the Final Competition for the R.I.B.A. Competition for a design for an aerodrome will be on exhibition in the R.I.B.A. Galleries, 9 Conduit Street, W.1, from 26 January to 2 February 1929, inclusive, between the hours of 10 a.m. and 8 p.m. (Saturday, 10 a.m. and 5 p.m.).

The two prizes, the first prize of £125, and the second prize of £25, have been presented to the Council of the

Royal Institute of British Architects by the directors of the Gloster Aircraft Company, Ltd., and Messrs. H. H. Martyn and Co., Ltd.

The schemes will deal with a London aircraft terminus suitable to the supposed requirements of air traffic 15 years hence.

The jury to award the prizes consists of :—Sir Sefton Brancker, K.C.S., Mr. C. Cowles-Voysey, Mr. E. Vincent Harris, Sir Edwin Lutyens, R.A., Major R. Mayo (Consulting Engineer, Imperial Airways, Ltd.), Mr. T. S. Tait, Mr. Maurice E. Webb, Mr. G. E. Woods-Humphrey (General Manager, Imperial Airways, Ltd.).

Members' Column

PRACTICE.

OWING to death of Architect with good practice in the country, the Executors wish to find at once an Architect of ability who would purchase the practice, and carry on work now in the office.—Apply Box 1419, c/o The Secretary R.I.B.A., 9 Conduit Street, London, W.1.

ASSISTANCE OFFERED.

A.R.I.B.A., experienced, having spare time, offers reliable assistance, or full conduct of work, including supervision, adjusting accounts, etc. Good knowledge of quantities. Would consider partnership with an established firm.—Box 4041, c/o The Secretary R.I.B.A., 9 Conduit Street, London, W.1.

PARTNER WANTED.

MEMBER of the Institute requires a Partner in his growing general practice in Devonshire. Suitable for a young man able to carry work through.—Apply Box 3233, c/o The Secretary R.I.B.A., 9 Conduit Street, London, W.1.

PARTNERSHIP WANTED.

PARTNERSHIP required in London or Kent district by A.R.I.B.A. with wide and exceptional experience as designer and detailer of high-class domestic, bank and office buildings. Highest references. —Apply Box 1128, c/o The Secretary R.I.B.A., 9 Conduit Street, London, W.1.

OFFICE ACCOMMODATION WANTED.

MEMBER requires room in Finsbury Square district, with use of 'phone.—Box 5334, c/o The Secretary R.I.B.A., 9 Conduit Street, London, W.1.

A.R.I.B.A., with small growing practice andworks of large nature pending, is anxious to meet another architect with a view to sharing office expenses. If necessary is willing to help with other works—supervision, etc. West End preferred, but not essential.—Reply Box 0503, c/o The Secretary R.I.B.A., 9 Conduit Street, London, W.1.

OFFICE ACCOMMODATION.

SENIOR member, with offices in the Temple, offers drawing accommodation and address to one or more junior members commencing practice at a moderate rent, or alternatively to share his offices (not running expenses) with another member of the R.I.B.A.—Apply Box 1719, c/o The Secretary R.I.B.A., 9 Conduit Street, London, W.1.

FELLOW of the Institute with a West End office, having a room to spare, desires to meet another architect with a view to sharing accommodation and running expenses.—Apply Box 7474, c/o The Secretary R.I.B.A., 9 Conduit Street, London, W.1.

AN Associate of the Institute in private practice, with well appointed office near Bedford Row, is willing to act as London representative for provincial Architects, and undertake to visit, supervise and report upon work during progress.—Box 8129, c/o The Secretary R.I.B.A., 9 Conduit Street, London, W.1.

F.R.I.B.A., with an office in the West End, desires to meet another Architect with a view to sharing accommodation and running expenses.—Apply Box 2118, c/o The Secretary R.I.B.A., 9 Conduit Street, London, W.1.

It is desired to point out that the opinions of writers of articles and letters which appear in the R.I.B.A. JOURNAL must be taken as the individual opinions of their authors and not as representative expression of the Institute.

Minutes VII

SESSION 1928–1929.

At a Special General Meeting held on Tuesday, 8 January 1929, at 8 p.m., Mr. H. V. Lanchester, Vice-President, in the Chair.

The attendance book was signed by 30 Fellows (including 11 members of Council), 24 Associates (including 1 member of Council), 9 Licentiates (including 2 members of Council).

The Chairman announced that this was a Special General Meeting called for the purpose of discussing—as a preliminary to a postal vote to be taken at a later date in accordance with the provisions of Bye-law 70—the proposals for the development of the R.I.B.A., which had been prepared by the Council and published for the information of members in the JOURNAL dated 22 December 1928.

Mr. Stanley Hall, Vice-President, made a detailed explanatory statement of the development proposals, which had been unanimously approved by the Council and the Allied Societies' Conference.

A letter from the President was read regretting his unavoidable absence from the meeting and warmly supporting the proposals.

A general discussion then ensued in which many members took part.

Mr. Stanley Hall, having briefly replied to various questions that had been raised in the discussion, the meeting terminated at 10.10 p.m.

Minutes VIII

SESSION 1928–1929.

At a Special General Meeting held on Tuesday, 15 January 1929, at 5.30 p.m., Mr. Maurice E. Webb, M.C., D.S.O., Vice-President, in the chair.

The attendance book was signed by 16 Fellows (including 5 members of Council), 10 Associates, 1 Licentiate, and several visitors.

The Chairman announced that on the recommendation of the Art Standing Committee, the Council had decided to arrange a series of special meetings at which papers on schemes for the Development of London and similar problems would be read.

Mr. H. V. Lanchester, Vice-President, having read a paper on "The Development of South London," a discussion ensued, and on the motion of Mr. Arthur Keen [*F.*], seconded by Lt.-Col. Cecil B. Levita, C.B.E., M.V.O., Chairman of the London County Council, a vote of thanks was passed to Mr. Lanchester by acclamation and was briefly responded to.

The proceedings closed at 6.35 p.m.

Minutes IX

SESSION 1928–1929.

At the Sixth General Meeting (Ordinary) of the Session 1928–1929, held on Monday, 21 January 1929, at 8.30 p.m., Mr. Walter Tapper, A.R.A., President, in the Chair.

The attendance book was signed by 20 Fellows (including 9 members of Council), 24 Associates (including 3 members of Council), 2 Licentiates, 1 Hon. Fellow, 1 Hon. Associate, and a large number of visitors.

The minutes of the Ordinary General Meeting held on 7 January 1929 having been published in the JOURNAL, were taken as read, confirmed, and signed as correct.

The Hon. Secretary announced the decease of :—

Arthur Stansfield Dixon, M.A. Oxon., J.P., elected Fellow 1907. Mr. Dixon was a Past-President of the

Birmingham Architectural Association, and represented that body on the R.I.B.A. Council from 1909 to 1911.

Hallam Carter Pegg, elected Associate 1896, Fellow 1903.

Walter Hugh Barker, elected Associate 1894.

Walter Robert Jaggard, elected Associate 1895, Fellow 1914.

and it was Resolved that the regrets of the Institute for their loss be entered on the Minutes, and that a message of sympathy and condolence be conveyed to their relatives.

The following members attending for the first time since their election were formally admitted by the President :—

Mr. W. R. Davies, C.B. [*Hon. A.*].
Mr. Philip Tilden [*F.*].
Mr. J. T. Castle [*A.*].

Mr. Oswald P. Milne [*F.*] read a review of the works submitted for the Prizes and Studentships 1929, and illustrated it by lantern slides.

On the motion of the Rt. Hon. Lord Danesfort, K.C., seconded by Mr. W. R. Davies, C.B., a vote of thanks was passed to Mr. Oswald Milne by acclamation.

The Presentation of Prizes was then made by the President, as follows, in accordance with the award :—

The R.I.B.A. Tite Prize. A Certificate and £50.—The Tite Certificate to Mr. Wm. Crabtree (Liverpool University School of Architecture) ; Certificates of Hon. Mention to Mr. C. St. C. R. Oakes (Northern Polytechnic) ; Mr. John L. Martin (School of Architecture, Victoria University, Manchester) ; Mr. F. R. S. Yorke (Birmingham School of Architecture) ; Mr. John F. D. Scarborough (absent in Australia).

The Victory Scholarship. A Silver Medal and £150.—The Victory Silver Medal to Miss Betty Scott (Architectural Association) ; Certificates of Hon. Mention to Mr. E. G. Gardner (Architectural Association) ; Mr. George A. Goldstraw, B.A. [*A.*] (School of Architecture, Victoria University, Manchester).

The Pugin Studentship. A Silver Medal and £75.—The Pugin Silver Medal to Mr. R. H. Matthew (Edinburgh College of Art) ; Certificate of Hon. Mention to Mr. F. Russell Cox (Birmingham School of Architecture).

The R.I.B.A. Silver Medal and £50 for an Essay.—The Silver Medal and cheque for £50 to Mr. James F. Howes (Royal Academy School of Architecture).

The R.I.B.A. (Alfred Bossom) Travelling Studentship. Gold Medal and £250.—The Gold Medal and a Silver Medal to Mr. Frank Scarlett, B.A. [*A.*] (School of Architecture, London University) (absent in Italy). Silver Medals to Mr. Terence Walter Snailum [*A.*] (Architectural Association) ; Mr. Johnson Blackett [*A.*], Liverpool University School of Architecture, and Mr. A. A. V. Campbell [*A.*].

The Grissell Prize (not awarded). A Certificate of Hon. Mention to Mr. L. M. Chitale [*A.*] (School of Architecture, London University).

The Godwin and Wimperis Bursary. A Silver Medal and £250.—The Godwin Silver Medal to Mr. Hope Bagenal, D.C.M. [*A.*].

The R.I.B.A. Ashpitel Prize, 1928. Books to the value of £10 to Mr. James Thomas Castle [*A.*].

The R.I.B.A. Silver Medal for Students of Schools of Architecture recognised for exemption from the Final Examination, to Mr. David Bowen Solomon (Liverpool University School of Architecture).

The R.I.B.A. Bronze Medal and Books to the value of £5, for Students of Schools of Architecture recognised for exemption from the Intermediate Examination, to Mr. Herbert Jackson (Birmingham School of Architecture).

The President introduced to the meeting the successful candidates for the following Scholarships and Prizes awarded in 1928, and presented them with Certificates :—

The R.I.B.A. Henry Jarvis Travelling Studentship.—Mr. Leonard W. T. White [*A.*] (absent in Rome).

The R.I.B.A. Archibald Dawnay Scholarships.—Mr. Leslie Arthur Chackett and Mr. John Hughes.

The R.I.B.A. Anderson and Webb Scholarship at the School of Architecture, Cambridge University.—Mr. James Roland Smith.

The R.I.B.A. Henry Jarvis Scholarship at the Architectural Association.—Mr. Harry M. Peskett.

The R.I.B.A. Howard Colls Studentship at the Architectural Association.—Mr. E. W. N. Mallows.

The R.I.B.A. Donaldson Silver Medal at the Bartlett School of Architecture, University of London.—Mr. W. G. D. Anderson.

The proceedings closed at 10.5 p.m.

Members sending remittances by postal order for subscriptions or Institute publications are warned of the necessity of complying with Post Office Regulations with regard to this method of payment. Postal orders should be made payable to the Secretary R.I.B.A., and crossed.

R.I.B.A. JOURNAL.

Dates of Publication.—1929 : 9, 23 February ; 9, 23 March ; 13, 27 April ; 18 May ; 1, 15, 29 June ; 13 July ; 10 August ; 21 September ; 19 October.